The Farm

QUARTERLY, SPRING 1953, FIFTY CENTS

Spring at Malabar

By Louis Bromfield

Feeds Can Make or Break You

Special Feed Fact Section

UREA . . .

new wonder food for cattle looks like this magnified 247 times

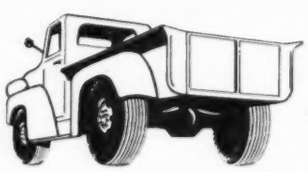
R V.8 1953/54

"The Greatest **PULL** on Earth" starts here—

1. RULER-STRAIGHT LUGS
come closer together at shoulders—and so take wedge-like bites that hold soil in place—to give Goodyear tires greater grip.
2. O-P-E-N C-E-N-T-E-R
pioneered by Goodyear. Farm experience proves it bites deeper, sharper—pulls better—when combined with straight lugs!
3. LONG EVEN WEAR
—because Goodyear straight lugs work against the soil evenly, they wear evenly, roll smoothly on the road, wear longer.
GOODYEAR
SUPER SURE GRIP TRACTOR

WHEN THE GOING IS REALLY TOUGH— when you need extra traction in mud or snow—Goodyear farm-proved Super-Sure-Grips pull where other tires won't. That's why year after year, farmers vote Super-Sure-Grips their first choice tractor tire by an overwhelming margin—there is NO close second! Experience proves Goodyears pull better. If your tires are losing their grip, better get new Goodyears now. They cost you nothing extra! Goodyear, Farm Tire Dept., Akron 16, Ohio.

THERE'S A SPECIALLY DESIGNED GOODYEAR TIRE FOR EACH VEHICLE ON THE FARM!



Trucks, farm implements and passenger cars serve you better, more economically, when they roll on specially designed Goodyear tires. That's why more people use Goodyears for more purposes than any other tire on earth!

Super-Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

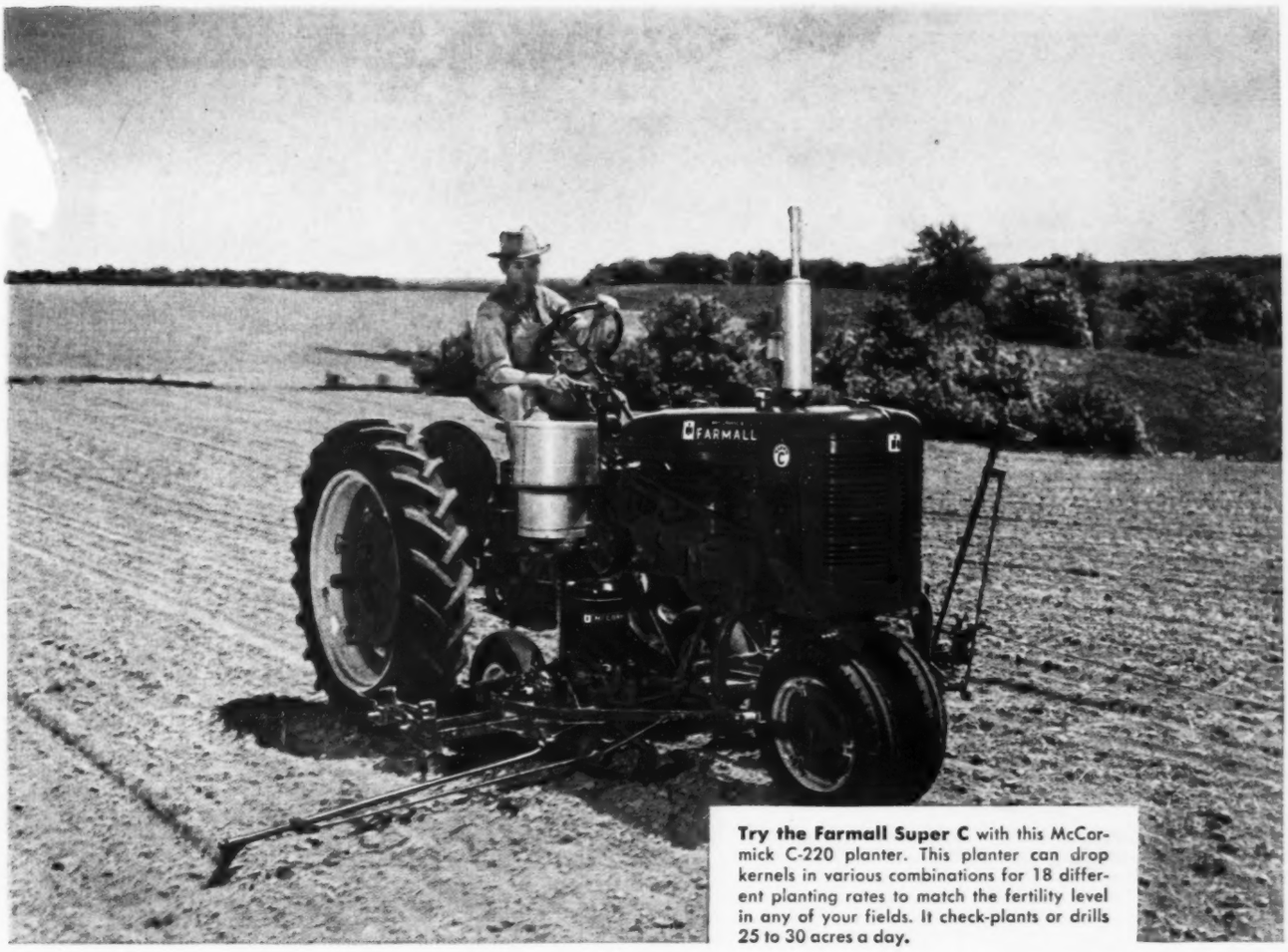
FIRST in Traction • FIRST in Long Wear • FIRST in Popularity!

GOODYEAR

Super-Sure-Grip Tractor Tires

LET'S NAIL DOWN THE TOPSOIL
—it's America's greatest treasure. Cooperate with your State Soil Conservation program.

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network



Try the Farmall Super C with this McCormick C-220 planter. This planter can drop kernels in various combinations for 18 different planting rates to match the fertility level in any of your fields. It check-plants or drills 25 to 30 acres a day.

You plant to fertility level—fast, accurately

with a McCormick® Farmall® Super C

See how fast... how accurately... how easily you can plant!

Slip the Farmall Super C into fuel-saving third gear for 5 mph. planting. Nudge forward the Touch-Control lever —only a hand's width from the throttle—to lower the McCormick forward-mounted planter to the desired depth.

You easily see the marker track—less than a rod ahead of the radiator cap—to drill winding contours or to plant straight rows you can cross-cultivate.

Relax in the cushioned hydraulic seat up out of the dust. Your hands and feet reach *all* controls comfortably because the seat adjusts forward or backward *to fit you!*

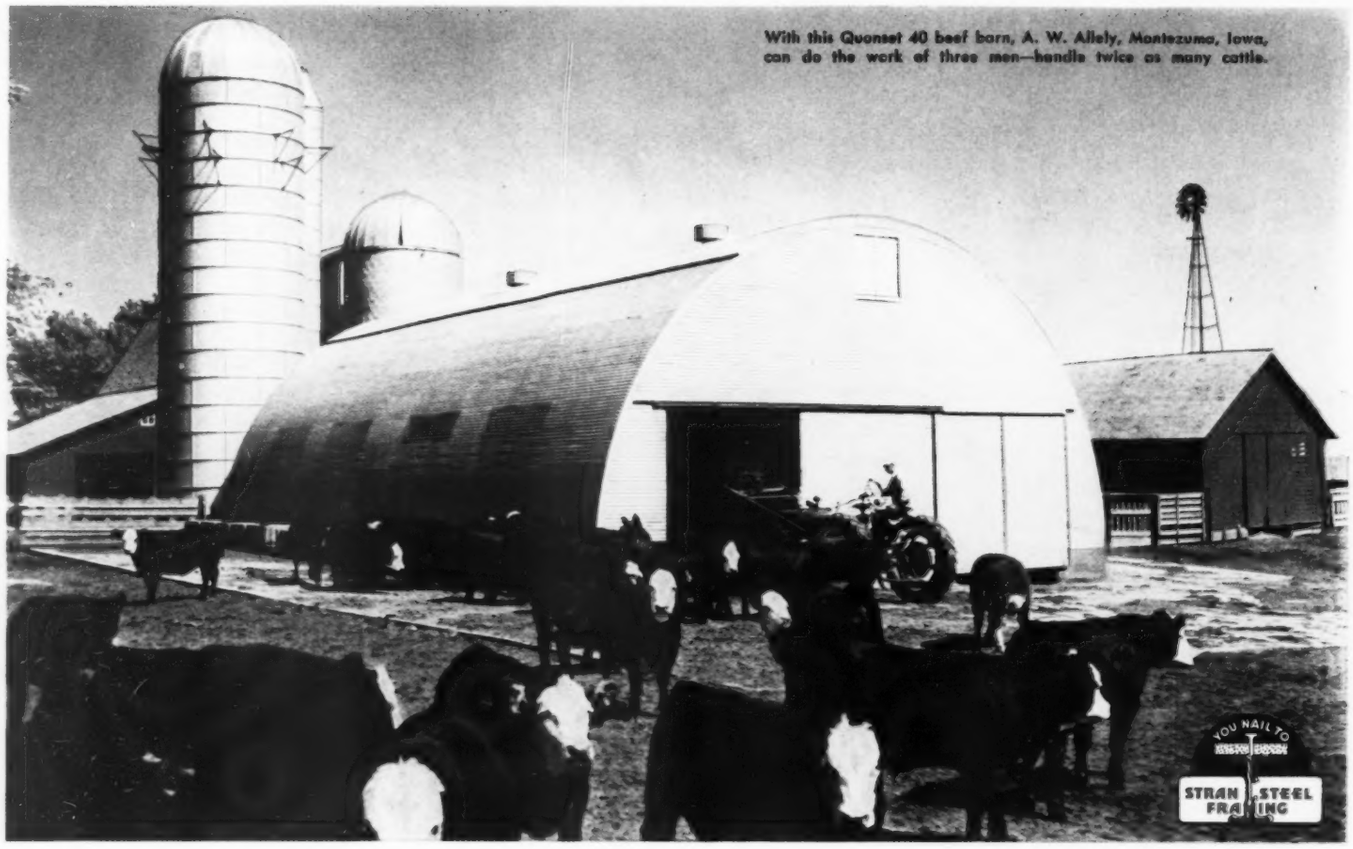
The movement of *one* hand slows the engine and raises the planting units. This also releases the check-wire and raises the marker *automatically*. A toe-touch on the disc brake pedal, and three quick turns of the 18-inch steering wheel brings the Super C around in its tracks, ready for a fast start on the next two rows!

Try the Farmall Super C with this McCormick C-280 cotton planter. See how the combination hoppers with quick-change bottoms permit you to plant cotton, corn, peanuts—most any seed—on beds, in furrows, or on the flat, and fertilize at the same time.

Ask your IH dealer to bring a Farmall Super C out to your farm. Put it through its paces with one of its matched McCormick implements. Prove to yourself that you can do better work at the wheel of a Farmall Super C tractor!

INTERNATIONAL HARVESTER

International Harvester products pay for themselves in use—McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Crawler Tractors and Power Units . . . Refrigerators and Freezers—General Office, Chicago 1, Illinois

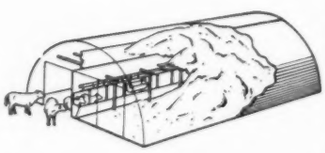


With this Quonset 40 beef barn, A. W. Allely, Montezuma, Iowa, can do the work of three men—handle twice as many cattle.

100,000 American farms are better producers . . . thanks to Quonset Quality-Construction

Quonset drying and storage permits earlier, cleaner harvest, better market control for W. R. Mitchell, Grundy Center, Ia.

"My farm machinery is easier to service," says Endren P. Johnson, Huxley, Iowa, of his Quonset.



"Now, with a Quonset 40 x 60, I can do the work that used to take three men," says A. W. Allely, who handles 60 cows and their calves, 20 brood sows and 120 pigs a year at Montezuma, Ia. Before he built his Quonset, the same operation required two hired men in addition to himself.

At feeding time, Mr. Allely simply topples chopped hay into the feeding rack (see diagram at left).

Silage is easily fed with an overhead carrier from an adjoining silo which runs the full length of the feed rack.

The Allely Quonset saves cleaning time, because it is post-free. With use of a power fork chore time is cut to the bone. Clear-span Quonset construction also makes it easier to blow hay into the building.

Quonset farm service buildings are designed to work as production tools . . . to cut costs, cut chore time, and make money for you. Find out today how you can have all-steel quality construction on your farmstead.

Easily Financed with the Quonset Purchase Plan. It's simple to finance your barn, hog house or machinery shed with the new Quonset Purchase Plan. Your dealer will gladly show you how.

Good-looking, durable and easy to maintain. That's the Quonset . . . all-purpose farm production tool.

Consult your authorized Quonset Dealer, a specialist in farm service buildings, or write us direct for complete information on the Quonset best suited to your operation.

Farm for the Future . . . with Quonset®

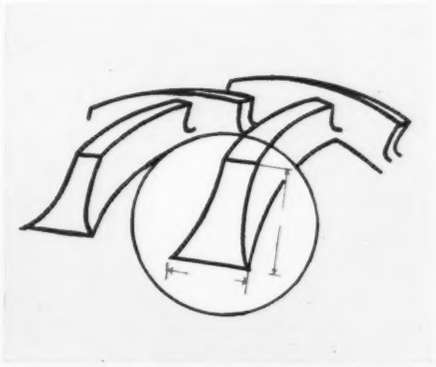
GREAT LAKES STEEL CORPORATION

Stran-Steel Division **Ecorse, Detroit 29, Mich.**

NATIONAL STEEL CORPORATION

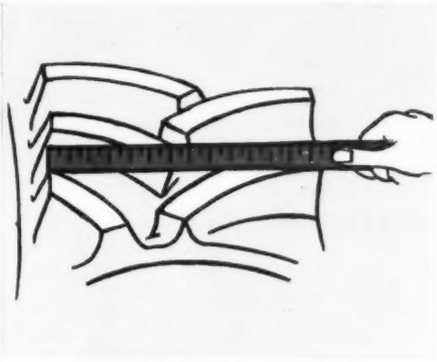
Here Are the IMPORTANT POINTS to look for Before You Buy Tractor Tires

CURVED AND TAPERED BARS
For a sharper bite and deeper penetration . . . greater drawbar pull.

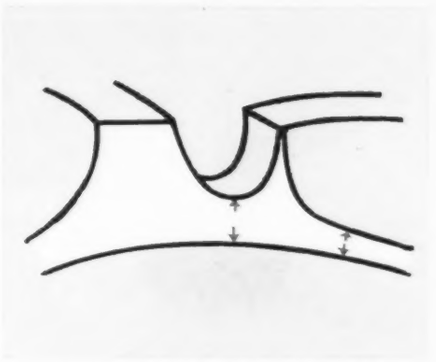


BIGGER, STRONGER SHOULDERS
For greater tread contact, for a bigger bite and longer and more even tread wear.

FLARED TREAD OPENINGS
To prevent soil jamming and to permit easy soil release.



WIDE FLAT TREAD
For more biting edge, full-width traction and longer life.



BUTTRESSED POWER LINKS
Prevent excessive bar wiping; eliminate bar-end body punching.

DUAL SHOCK PROTECTORS
Extra cap plies to absorb even the most severe impacts.

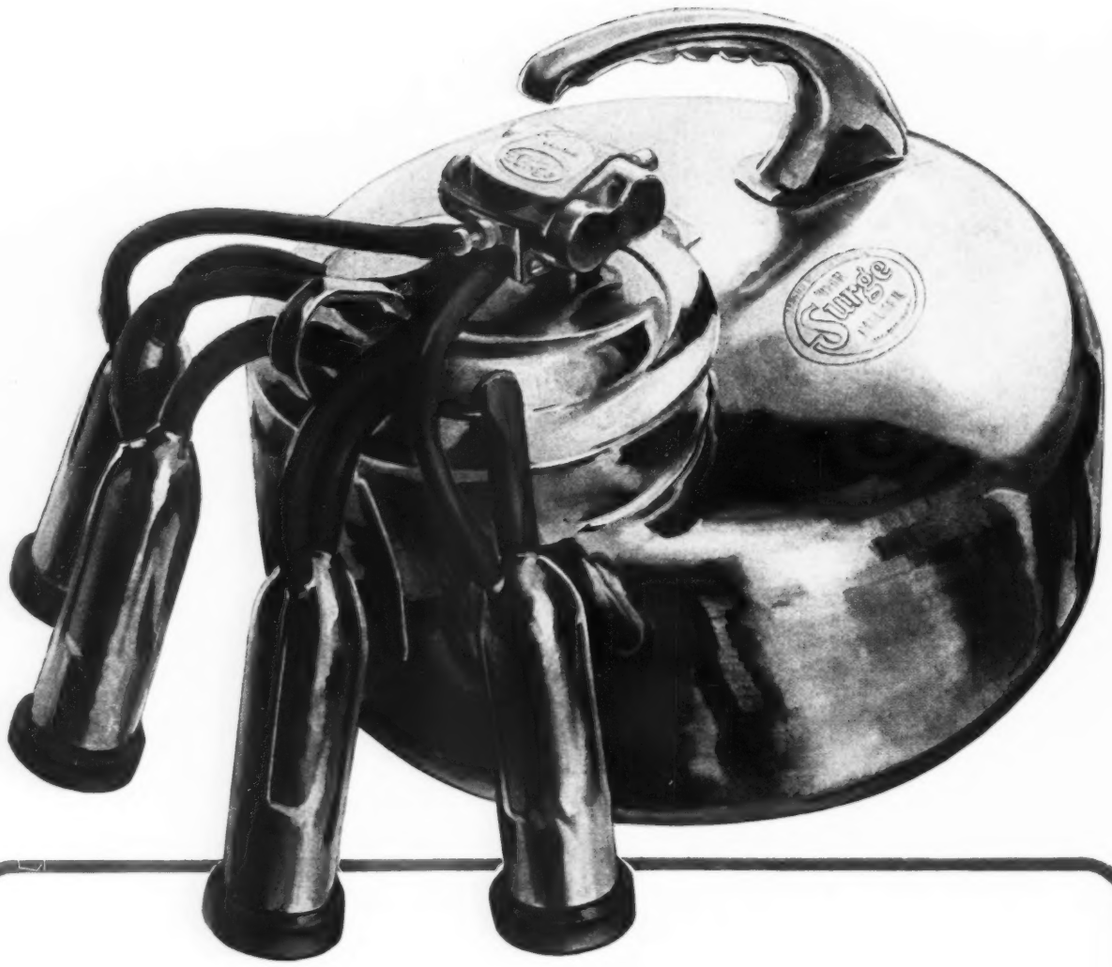
Only with Firestone CHAMPIONS DO YOU GET ALL THESE IMPORTANT ADVANTAGES—AND AT NO EXTRA COST

America's Future Progress Depends on Better and Safer Highways

Firestone
CHAMPION HEAVY DUTY TRUCK TIRE
A new, rugged, low-priced tire that is built for all-around farm truck service.

Enjoy the Voice of Firestone on radio or television every Monday evening over NBC

Copyright, 1952, The Firestone Tire & Rubber Co.



It Will Pay You Well to Wait a Little While for a SURGE!

We are really building a lot of Surge Milkers every day, but we don't have the materials to build them as fast as you want them installed. Because we *are* building thousands of Surges, your wait won't be too long.....and.....*it will pay you well to wait a little while for a Surge.*

That's because any milking machine that bears the Surge Nameplate milks with genuine Surge TUG & PULL that holds the teat cups down where they belong.

If the Surge did not do a really extraordinary job of milking cows we would have plenty of Surge Milkers.

Milk with Genuine Surge TUG & PULL

Copyright 1953, Babson Bros. Co.

BABSON BROS. CO.

2843 West Nineteenth CHICAGO 23, ILLINOIS

SYRACUSE • HOUSTON • SACRAMENTO • KANSAS CITY • TORONTO • ATLANTA • SEATTLE • MINNEAPOLIS

COMING IN SUMMER

In a small village behind the Iron Curtain in newly Sovietized East Germany, a public mass meeting was called a few weeks ago. Several farm laborers stood up in front of the meeting and charged that the two farmers, for whom they were working, had failed to deliver their full quotas of wheat to the State. They asked that they be recognized as a "co-operative farm" and demanded that the farms on which they worked be taken from the farmers and given to them. The Communist chairman of the meeting approved their demand and the land was transferred to them. A single and simple step. This sort of justice is an everyday occurrence back of the Iron Curtain. We can't tell you much more about the story that will appear in our Summer issue but it will answer your question, "What Would It Be Like to Farm in a Communist Country?"

Soon it will be fair time. We have gathered together the personal experiences of some of the best show men in the country for you, with their tips, feeding schedules and handling principles in the story "How To Win a Blue Ribbon."

Does a silo have to be built out of concrete or steel to do a good job? Some farmers swear by and some at pit silos and now there is another type being used —the field silo. It may look like an Indian mound after you finish it, but it is a quick and inexpensive way to store ensilage. It isn't perfect, though, and we'll bring you the experiences of people who have used field silos.

In Vermont, where feed and hay are scarce, they don't waste much even on their good cows. Cesaire LaCoste, the herdsman of Brigham Farms at St. Albans, Vermont, has worked out a program for their cows so that they will produce 1,000 pounds more milk per year. This is a story that everyone who produces milk will want to read.

For livestock men FARM QUARTERLY will bring helpful articles on preventing shipping fever and the control of screw worms. "Tailored Pastures" gives special mixtures for every kind of farm animals. They do better on pastures with the right grass and legume.

If you had trouble getting the milk and feed trucks over your lane this Spring during the wet weather, you will want to plan on improving the half mile stretch out to the state highway. "Building a Lane Right" will tell you how.

"Pickling Pickles" with the recipes that Grandma used to use will be featured in the Farm Home section and there will be a delightful article on "Kissin' Bridges" which, Grandma will tell you, were the old fashioned covered bridges across the creeks and rivers.

THE FARM QUARTERLY
22 East Twelfth St., Cincinnati 10, Ohio

R. J. McGinnis.....Editor
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Joann Bell Pierce.....Associate Editor
Chas. R. Koch.....Associate Editor
Noel Martin.....Art Director
Edna O'Connell.....Editorial Secretary
Aron M. Mathieu.....Business Manager

With hay crushers farmers make hay faster while the sun shines.

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B.F.Goodrich TRACTOR TIRES

Better on paper—best on the wheel

COMPARE THE LEADERS! Only BFG gives you all these features	BFG	TIRE A	TIRE B	TIRE C
ROUNDED PROFILE... for easier rolling and better penetration	YES	NO	NO	NO
OPEN-CENTER TREAD... cleans easily	YES	YES	NO	YES
EXTRA-HIGH CENTER... for greater traction	YES	NO	NO	NO
ARROWHEAD CLEATS... bite better—don't roll back	YES	NO	NO	NO
EXTRA RUBBER IN CENTER... for longer life	YES	NO	YES	NO
CURVED CLEATS... prevent bending	YES	NO	YES	YES

Here's why B. F. Goodrich tires save you time in the field

YOU CAN SAVE hour after hour of working time when your tractor rolls on powerful B. F. Goodrich tires. Just as a round-pointed shovel (left top) bites into the soil easily, so rounded-profile Power-Curve tires penetrate better, give you full shoulder-to-shoulder traction in reverse or forward.

Tires with a flat profile, like the square-pointed shovel, require greater pressure to dig into the soil, actually push dirt ahead.

Arrowhead Power-Curve cleats take a sharp, deep bite into the soil. Result: greater drawbar-pull. And because the cleats are evenly spaced from center to shoulder, dirt falls from the open channels. No dirt-clogged, spinning wheels to waste time, burn up fuel. Every turn of a Power-Curve tire counts for maximum traction and pull.

Compare the leading tires. On every count you'll be hours and dollars ahead with power-packed Power-Curve tires. See them at your B. F. Goodrich retailer's store. His address is listed under Tires in the Yellow Pages of your phone book. *The B. F. Goodrich Company, Akron, Ohio.*

TUNE IN
the Burns & Allen Show
CBS—TV, Thurs. Evenings
8:00 PM—E.S.T.

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

Always specify B. F. Goodrich tires when ordering new equipment

PIGS REACH MARKET FINISH *in Jig Time*

There are two critical nutritional periods in the life cycle of pigs. First, gestation and lactation; second, the period when pigs start eating until they reach approximately 100 pounds. It is during this time that close attention must be given to the feeding program if pigs are to be healthy and reach market finish in jig time.

Seagram Solubles, rich in proteins, minerals, and B-vitamins, contribute the important growth promoting factors necessary in a well-balanced feeding program.

Feed dealers know this and rely on Seagram Solubles to enrich the feeds they sell, so that their customers can get top prices for their livestock.

Seagram

SERVICE TO AGRICULTURE

Joseph E. Seagram & Sons, Inc.
Louisville 1, Kentucky

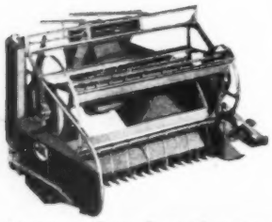
any boy can do a man's job

with the simple-to-operate

GEHL®

PRONOUNCE IT "GALE"

FORAGE HARVESTER



The GEHL Mower-Bar Attachment is making a hit everywhere! With a five-foot swath, it cuts standing crops from short Alfalfa to tall Sudan and Sorghum, chops and blows it into wagon . . . clearing the field in one operation, saving sweat, back-breaking labor and time. Helps you beat the man shortage and the weather.

QUICK CHANGE-OVER for 3-way Harvesting
From the Mower-Bar, you can change quickly to the Hay Pickup or Row-Crop Attachment. Your choice of engine power or power take-off from tractor.

. . . any boy who drives a tractor can operate a Gehl Forage Harvester. Many owners let their teen-agers run the outfit, and sometimes they do custom-work for neighbors. This simplicity of operation, known to all Gehl Chopper owners, indicates the smart, practical, experienced engineering in every part of the Gehl. Built by specialists in the manufacture of feed choppers for over half a century, the Gehl works better, lasts longer.

There's a big difference in Forage Harvesters. The Gehl chopping mechanism follows the basic principle so successfully used in Gehl Silo Fillers, famous for years. Clean, fast, uniform chopping that makes better feed . . . silage that packs well, keeps better, is one of the reasons for Gehl leadership in Forage Harvesters year after year.

Find out why ***Gehl has sold more Forage Harvesters than any other independent manufacturer.*** Talk to Gehl owners . . . visit your dealer.

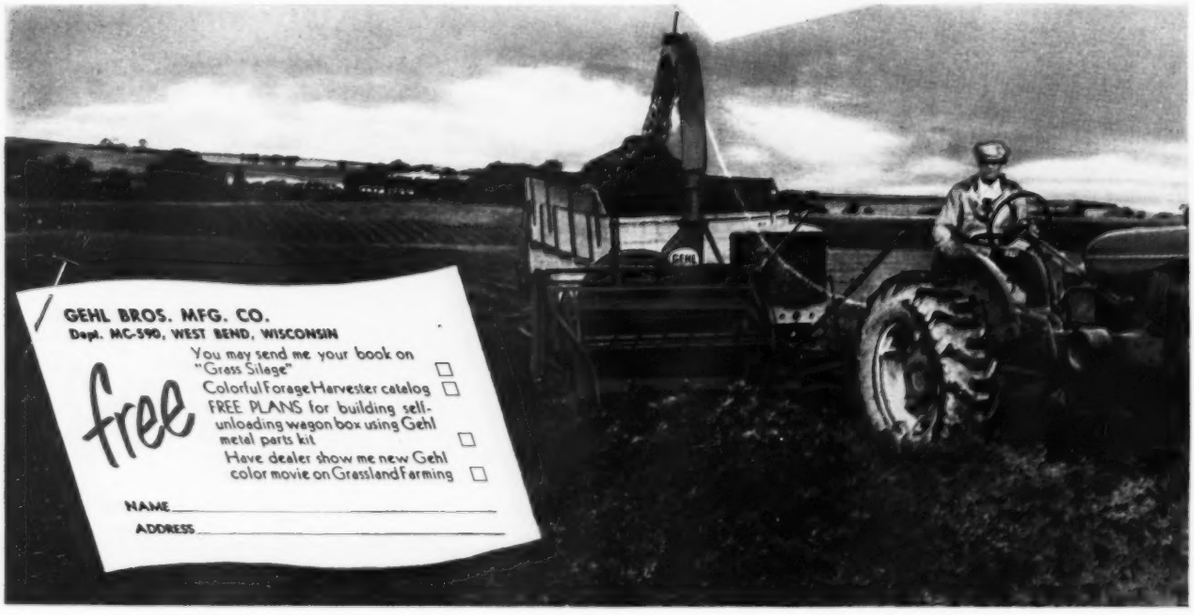
GEHL SINCE 1859 PRONOUNCE IT "GALE"

. . . a good name to go "buy"

Get the facts about "GRASSLAND" FARMING free!

Send for ***new free book:*** "Streamlined Methods of Harvesting Hay and Making Grass Silage." ***Tells how*** to store in stacks, trench silos, top-of-ground, or regular silos . . . ***who*** should go to grass farming . . . ***when*** to sow or plant . . . ***when*** to cut . . . ***how*** short to cut, and scores of other important questions that will show you how others are making ***more*** money with "grass silage."

MAIL THE COUPON TODAY!


GEHL BROS. MFG. CO.
Dept. MC-590, WEST BEND, WISCONSIN
free
You may send me your book on "Grass Silage" ☐
Colorful Forage Harvester catalog ☐
FREE PLANS for building self-unloading wagon box using Gehl metal parts kit ☐
Have dealer show me new Gehl color movie on Grassland Farming ☐
NAME
ADDRESS

A SAFE, STRONG START

Now . . . you can get *all the growth potential* of your young stock . . . safely, economically, quickly . . . with *Giant Feed Power*—created for you by Wayne Research thru exclusive blends and balances of 1953 *Power Ingredients!* Antibiotics; Vitamin B-12; 3-Nitro; B-Complex Vitamins; Trace Minerals; Sardine Oil; D-Activated Animal Sterol; Riboflavin; Calcium Pantothenate and many others in correct, high-potency proportions.

For REPLACEMENT CHICKS: Feed Wayne Chick Starter for remarkably *fast growth* and balanced *body development*. Builds rugged pullets with sturdy bodies and digestive systems geared for heavy early laying.

For BROILER CHICKS: Feed high-efficiency Wayne Rocket Broiler, get meaty, *premium finish* birds with minimum feed, time and work. Powerful ingredients, including 3-Nitro, assure bright combs, lustrous skin, golden shanks.

For PIGS: Creep-feed Wayne Tail Curler to push pigs (nursing or on sow's milk replacer) from 2 weeks to 75 lbs. in a hurry. Helps make runty pigs thrifty, normal pigs thriftier. Does so much—costs so little!

For CALVES: Feed Wayne Calf Starter for quick, uniform start at *substantial milk savings*. A highly-fortified feed to build bigger calves at 4 months, ready for earlier breeding. Every bite is balanced!

For TURKEY POULTS: Feed high-energy, low-fiber, 28% Wayne Turkey Starter (fortified with 3-Nitro) for early, low-cost gains.

All Wayne Poultry and Turkey Feeds named above are available in KRUMS (krumblized mash) form. KRUMS reduce waste; are easier, cleaner to feed; birds actually gain more!

Start in time! See your Wayne Feed Dealer NOW!

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WAYNE FEEDS

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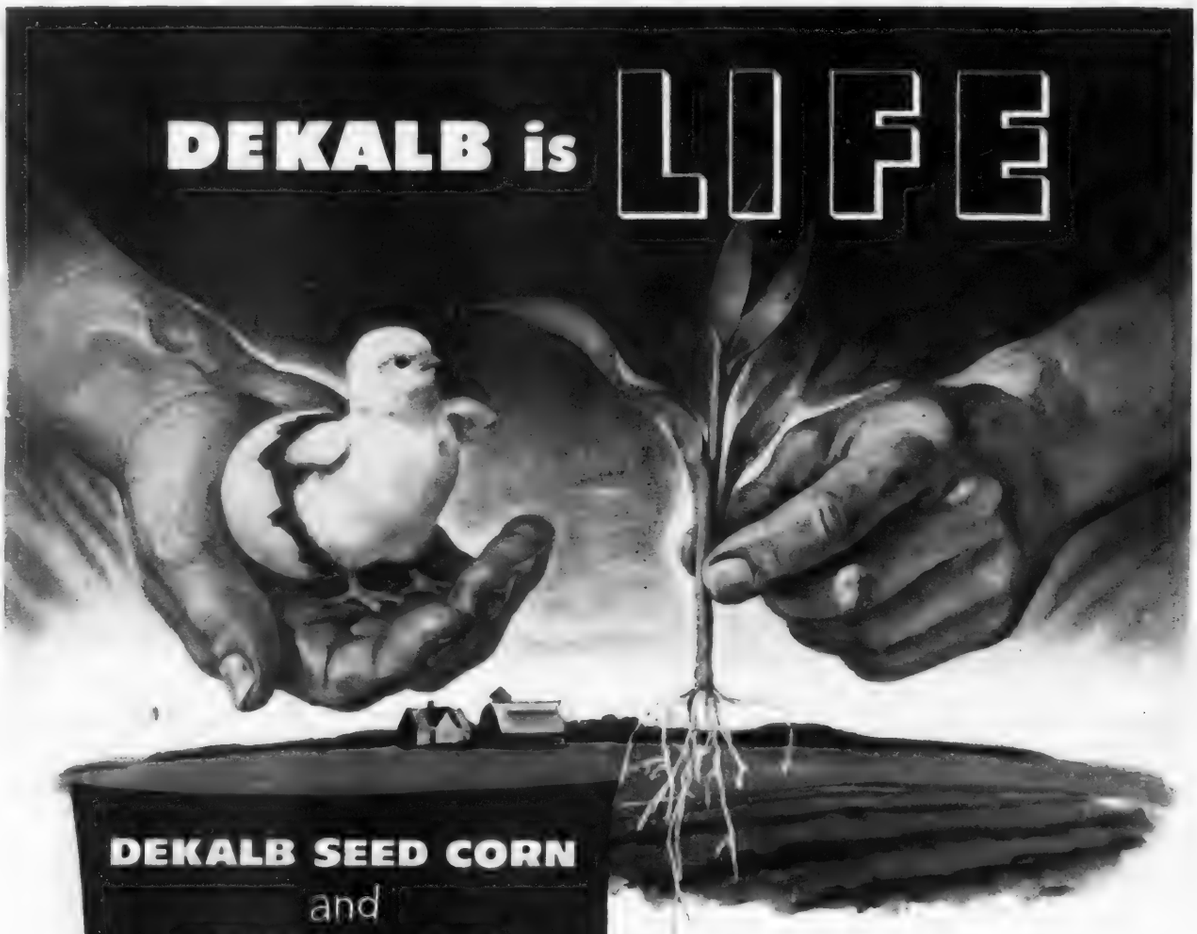
DEKALB is LIFE



DEKALB SEED CORN
and
DEKALB CHIX
mean BETTER LIVING
for YOU

Your farm is LIFE. And, what you put into it, and what you get out, *can* mean Better Living. DeKalb's two quality products—Seed Corn and Chix, are designed to help you make the most from your land and your labor. And DeKalb's steady growth can be traced to the accomplishment of that goal. Years of experience proves the correctness of the saying "You get what you pay for." So, put into your farm the best that money can buy. Isn't that the surest way of getting the most out of it?

BUY DEPENDABLE DEKALB

The Greatest Name **DEKALB** in Corn & Chix

DEKALB AGRICULTURAL ASSOCIATION, INC., DEKALB, ILLINOIS

Commercial Producers & Distributors of DeKalb Seed Corn and DeKalb Chix

GET A SHOWDOWN DEMONSTRATION of the FAR MORE POWERFUL FERGUSON "30"

SEEING IS BELIEVING

Whatever the power rating, whatever the size, whatever the performance you expect from your next tractor . . . insist on *seeing* before you buy. Here's a suggestion . . .

Call your Ferguson Dealer first!

Ask him to bring a Ferguson "30" to your farm for a Showdown Demonstration. Pick real tough jobs . . . especially those that have given you trouble with your present tractor.

Match your present tractor, or any other tractor, job for job, feature for feature with the Ferguson "30". Your search for the best of all tractors for your farm will end right there.

Your friendly Ferguson Dealer will be happy to bring a truckload of Ferguson Implements along with "the world's most copied tractor" when he visits your farm. He'll match the Ferguson "30" against all comers and give you a Showdown Demonstration of power, performance, and versatility . . . yes, of plain dollars-and-cents value . . . like you never saw before!

BIGGER

- ★ in power
- ★ in performance
- ★ in economy

Get your free copy of "How to Buy a Tractor" from your friendly Ferguson Dealer.

Seeing is Believing!

Ask your Ferguson Dealer for Showdown proof of unmatched performance on . . .

MOLDBOARD PLOWING	ROTARY HOEING	HARROWING	PLANTING
DISC PLANTING	WOOD-LOT SAWING	LOADING-SPREADING	DITCHING
FIELD TILLING	MIDDLEBUSTING	ROW-CROP CULTIVATING	TERRACING
SUBSOILING	MOWING	SIDE-DELIVERY RAKING	HAULING

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In tractors

sure **cure** for **oil thirsty engines!**

In trucks

In cars

Now you can obtain *greater* satisfaction from any overhauled engine... with Perfect Circle's new 2-in-1 Chrome Piston Ring Set!

Perfect Circle's new 2-in-1 Chrome Piston Ring Set has established a new high standard of piston ring performance. It is the truly modern set that seals compression, seals oil—for over *twice* as long as ordinary sets! Solid chrome plating on both the oil and top compression rings eliminates tedious break-in periods and assures sustained power and positive oil control for thousands of *extra* miles. And 2-in-1 is the *only* set that offers a choice of spring pressures to meet every condition of cylinder wear.

For new engine life, immediately responsive power and new oil economy, install Perfect Circle's new 2-in-1 Chrome Piston Ring Set on your next re-ring job. Perfect Circle Corporation, Hagerstown, Ind.; The Perfect Circle Co., Ltd., Toronto.

Perfect Circle *2 in 1 chrome piston ring set*

The Standard of Comparison

LETTERS

Artificial Insemination and Beef Cattle

Sirs:

I would like to know the status of artificially inseminating registered beef cows. I have been informed that the offspring cannot be registered. Would you give me your opinion on this?

Cambridge, New York

Howard H. Romack, M.D.

Here are the pertinent excerpts from rules of the major beef associations:

Hereford calves . . . are not eligible . . . except where the sire and dam of the calf were in the recorded ownership of the same herd at the time the calf was sired.

The Aberdeen Angus breeder must be the owner of the cow and the bull, not to exceed three co-owners on the bull, at the time of service.

A Shorthorn calf may be registered when the request is accompanied by (1) a certificate (secured from the Association) from the owner of the bull identifying the bull and the container in which the semen was placed and (2) a certificate signed by the owner of the cow and by the technician or veterinarian which identifies the bull and the container in which the semen was placed and the inseminated cow. In the case where both cow and bull are owned by the same person, no certificates are necessary.

Bull Control With A Chain

Sirs:

Since I am the man leading the bull, I should like to answer the letter from Mr. Josef Polacek in the Winter issue in which he criticized us for not using a staff. I have handled bulls since I was fourteen years old and not once would I have considered leading a bull with a chain until I came to COBA (Central Ohio Breeding Association). In amazement, I found that most bulls become considerably calmer when used for producing semen.

I am around the bulls all day long, tending to them and very seldom use anything but the chain you saw in the picture, except in unusual cases calling for different treatment. In handling the bulls every day, I have become very sensitive to the touch of the chain and a misbehavior on the part of a bull is corrected by a slight whiplike action from the end of the chain to the nose ring. When a bull gets out of hand, it is just as dangerous with one or two men leading him. Through my experience, I find more control over the bull with a chain than with a staff. Here at COBA we have various safety measures for handling bulls in close quarters and are continually looking for safe and efficient means to handle them.

Columbus, Ohio

Stephen D. Boike, *Herdsman*

How To Make A Gadget

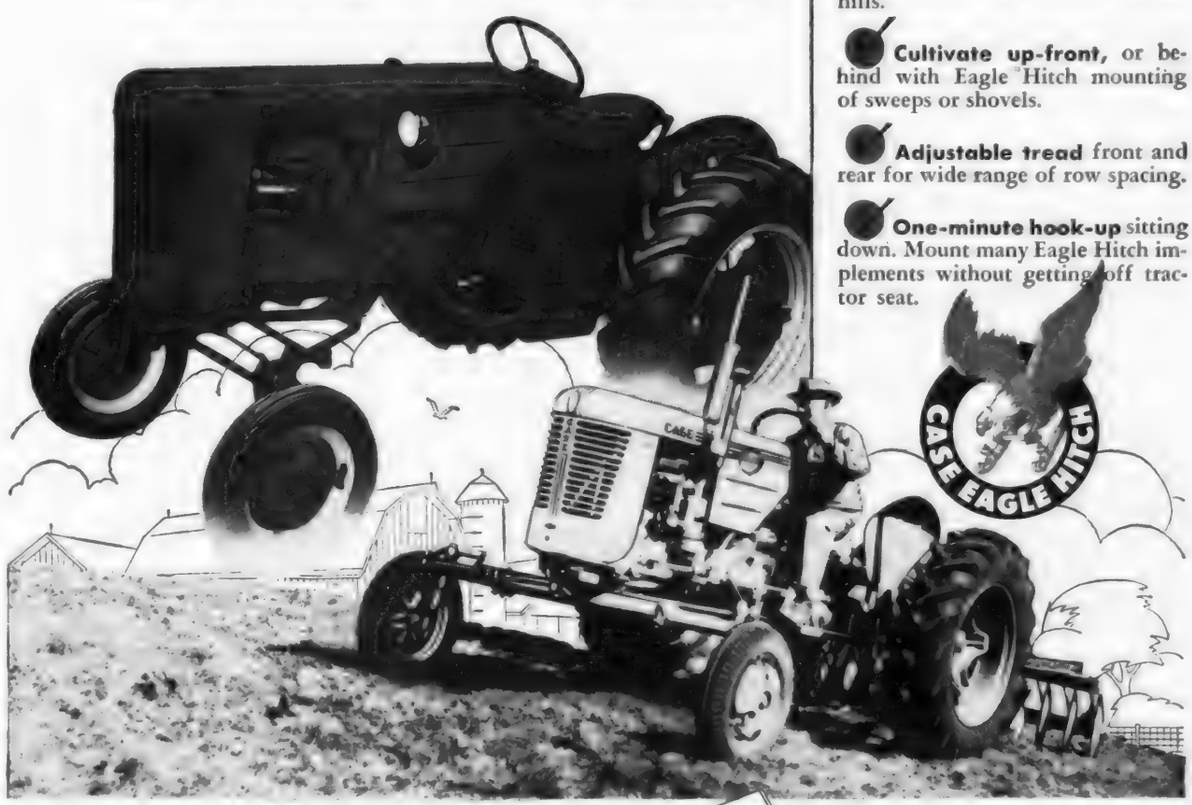
Sirs:

I would enjoy a section on home-made gadgets. For instance: I farm a field which is almost a half mile across and it is difficult to see a marker placed at one end of the field when laying off your lands in plowing or disc-

(*Continued on page* 151)

CASE PRESENTS
The Newest of Modern Tractors

- LOW SEAT
- LOW PLATFORM
- FULL CROP CLEARANCE



Low seat. Handy to get on, handy to controls, handy to watch your work.

Low platform. Just a step from the ground. Yet full crop clearance for cultivation.

Side entrance ahead of fender. No need to climb over rear-mounted implements.

Low profile. Tail-pipe exhaust and low air intake optional, as shown at left.

Low center of gravity. Unusual stability for operation on side hills.

Cultivate up-front, or behind with Eagle Hitch mounting of sweeps or shovels.

Adjustable tread front and rear for wide range of row spacing.

One-minute hook-up sitting down. Mount many Eagle Hitch implements without getting off tractor seat.

You never before saw a tractor so easy to get on and off as this new low-profile model in the Case 2-plow "VA" Series. You just step on the roomy platform and settle into the low "body-guard" seat, suspended on torsional rubber springs for comfortable all-day riding.

Like all Eagle Hitch Tractors . . . three sizes and 15 models . . . this new low-seater gives you shock-free steering, Constant Hydraulic Control, a heavy-duty high-torque engine with lugging power for hard pulls. You save hundreds of motions every day, take less time to hook up get to the job, get more productive time in the field. See it, first chance, at your Case dealer's — arrange for a personal demonstration.

GET THIS FREE BOOK — See the full pictorial story of Eagle Hitch Farming — all the ways it speeds and lightens your work, just how its several features work, how it makes your farming more productive. Free with coupon.

MAIL COUPON FOR YOUR COPY

For "What is Eagle Hitch Farming," also catalog or folders, mark here or write in margin any size tractor, any kind of implement or machine that interests you. J. I. Case Co., Dept. C-90, Racine, Wis.

Eagle Hitch Tractors

- ☐ Low-seat 2-plow Tractor
- ☐ Big 2-plow "SC" Tractor
- ☐ 3-plow "DC" Tractor
- ☐ Eagle Hitch Implements
- ☐ Manure Spreaders
- ☐ 4-5 plow "LA" Tractor

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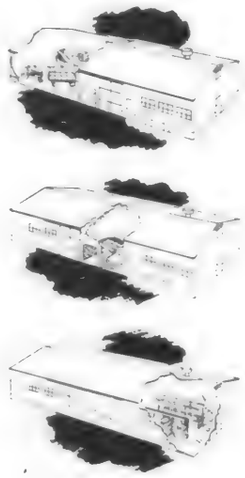
Save Time – Put More Chores Under One Butler Building Roof!



You'll be amazed to see how much time . . . and money . . . you save when you put more of the things that require daily chores under one sturdy Butler Building roof.

For instance, your Butler Building could serve you as a machine shed, a garage, overhead granary and a hog house all at the same time. That's how a farmer in Wisconsin uses his. He also writes that, "I decided on a Butler Building because I wanted a fire-safe building that would never need paint or repairs."

That's what you get with a Butler Building. Many other benefits, too! They're up and ready to use in a hurry . . . vermin and rodent-proof . . . weather-tight . . . wind-resistant . . . built to last! You have a choice of galvanized or aluminum covering.

Thinking of a new farm building? See your Butler Building dealer *soon* . . . or mail coupon *right now!*

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THE FARM'S PICTURES

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DO YOU LIKE PICTURES?

Subscribers to Farm Quarterly, as well as advertisers or people in the trade, are invited, when passing through Cincinnati, to stop in at our offices, 22 East 12th Street, and look through our photographic files. There are about 15,000 pictures filed by subject. If you see something you like, we can arrange with the photographer for you to have it in a 11 x 14 print, suitable for framing in your home; or for using in company house organs or catalogues.

The Dairy Barn

Block That Kick

Every farmer who has been battered and bruised by a cloven hoof or had his milk bucket or milking machine banged and dented by the same near-lethal hoof, has taken an interest in trying to develop a positive cure for kicking. In some countries it is the practice to loosely anchor the cow's right hind foot to the left wall of the stall with a short length of rope. In America we have followed the practice of treating all cows as innocent of this malicious habit until proved guilty. Here we have concentrated on treating just the kickers. One standard way has been to tie a rope to the right leg and toss the other end over a beam, pulling the leg backward and upward until only the tips of the toes remained on the ground for balance. The trouble here was that a lurch or slip on the part of the cow might dislocate or even break her leg — which seems a little drastic even to a man who has been kicked. Another method is to tie on a figure 8 hobbles just above the hock, fastening the two legs together. This is fine, if you wrap around the rope without being rapped with a hoof, though it, too, impairs the cow's balance. Chain hobbles have been devised which are easier to apply and do the same sort of job. Some hard-headed, strong-minded hand milkers have claimed that they can effectively stop a cow from raising her right leg by burrying their heads in her flank when they milk.

ROPED LEGS stop kicking, but roping ain't easy.

A new gadget on the market follows this flank pressure system. This new device, manufactured by the Pride Hybrid Co. of Glen Haven, Wisconsin, is in the form of an adjustable yoke which fits over the back and applies pressure on each flank using a wooden block instead of the milker's head to fit the flank. With the yoke in place, the cow can move her legs

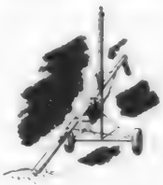
Handle Grain Faster...Store it Safer with Butler Augers and Grain Bins

You get faster, more efficient grain handling . . . safer, more profitable storage . . . when you put Butler Auger Loaders and Grain Bins to work on your farm.

More farmers use Butler Grain Bins than any other make because these safe, sturdy, all-steel Bins are just what they need to hold and protect their grain for bigger profits. Low initial cost . . . fast, easy erection . . . long maintenance-free service over the years—all prove the economy of Butler Bins.

Butler Aeration Equipment is also available to help you reduce temperature and moisture in farm stored grain.

You can save backbreaking hours of work yet handle your harvest faster, more efficiently, when you use Butler Auger Loaders. Balanced for easy, one-man operation, rugged Butler Augers are built to stand up under heavy, year-round use. All five sizes (16′ up to 41′) of Butler Augers have adjustable discharge height and can be powered by either gas engine or electric motor. You can be sure Butler Augers will satisfy your individual requirements for easy, efficient grain handling.



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Please send me complete informations on the following Butler Farm Products: ☐ Grain Bins ☐ Auger Loaders ☐ Stock Tanks ☐ Hog Feeders ☐ Hog Troughs ☐ Feed Pans ☐ Aeration Equipment

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BUTLER
STEEL PRODUCTS

OIL EQUIPMENT — STEEL BUILDINGS
FARM EQUIPMENT — CLEANERS EQUIPMENT
SPECIAL PRODUCTS

1 Handy Teeter-Totter Speeds Unloading of Pick-Up

A wooden platform extending beyond tail-gate and a 3" pole nailed to it just ahead of the tail-gate speeds unloading from your trucks in this simple teeter-totter system.

2 Properly Cleaned and Gapped Spark Plugs Assure Best Performance . . .

Keeping your spark plugs properly cleaned and gapped can save you time and bother. Dirty spark plugs waste gas — impair performance. It's smart to keep an extra set of spark plugs ready at all times. Let your nearby Auto-Lite Spark Plug Dealer service your sets regularly — he has the proper tools and equipment.

3 Here's Another TIME SAVER . . .

Auto-Lite Transport Spark Plugs Give Quick Starts —Gas Economy—Unsurpassed Performance

For quick starts . . . for gas savings all day long . . . for top performance whether you're hauling chicken feed or pulling stumps, replace worn plugs with Auto-Lite Transport Spark Plugs. This plug gives you a wide heat range that means lower cost per acre or mile of spark plug operation . . . plus these outstanding features:

- ★ **AIRCRAFT TYPE INSULATOR** — offers maximum resistance to heat and reduces fouling.
- ★ **HEAVY ELECTRODES** — give long gap life which contributes to low service costs by requiring less frequent gapping.
- ★ **RUGGED CONSTRUCTION** — especially suitable for the most severe farm operation.

Auto-Lite Transport Spark Plugs are specified as original equipment on many of America's finest trucks and tractors. See your Auto-Lite Spark Plug Dealer the next time you're in town.

Auto-Lite Spark Plugs — Patented U.S.A.

AUTO-LITE SPARK PLUGS

MONEY CANNOT BUY A BETTER SPARK PLUG

TUNE IN "SUSPENSE!"... CBS RADIO MONDAYS... CBS TELEVISION TUESDAYS

enough to keep her balance, but she can't wind up for a swift kick.

A home-made device for accomplishing much the same thing can be rigged with a length of quarter-inch rope with a metal eye splice in one end. The animal's body is circled by the rope so that the rope passes just in front of the udder and across the flanks and the loop is tightened with the splice over the spine. The free end is then knotted. If the cow attempts to kick, splice and knot which are both over the spine will cause her enough pain to make her think again.

LADIES ACQUIRE RINGS for their fingers and under their eyes as they grow older; cows get them on their horns.

Rings on A Cow's Horn

In his new book, *A Veterinary Handbook for Cattlemen,* which is reviewed on page 18 of this issue, Dr. J. W. Bailey tells how to use the cow's horn to find her age and her breeding efficiency. Because the cow's horns naturally grow thicker and heavier for some time before and after calving, rings are formed. If these rings are evenly spaced you can usually count on her having had a calf a year and figure her age from the rings. When the rings are wide spaced and uneven, you can figure that she has had some serious breeding trouble and that she will probably continue to run into such difficulties. This is but one item of many in a chapter on practical pointers for cow owners in the book.

Lights That Kill Germs

Waldo Groesbeck's loafing barn glows all night with an unearthly purple light, but the cows inside don't mind —their colds have been cured, none of them have caught new ones, and they don't even itch any more. A few weeks ago Groesbeck called in his veterinarian to see what he could do about an epidemic of colds which had run through his herd. The colds were found to be less serious

(*Continued on page* 150)

You've never seen a tractor to match this..

NEW FORD TRACTOR

Golden Jubilee MODEL

★ **MOST ADVANCED HYDRAULIC SYSTEM IN ANY TRACTOR**
Live-Action with Hy-Trol

★ **EXTRA POWER...With Great New "Red Tiger" Engine . . .**
Ford's Greatest Tractor Engine

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★ **A BIGGER, HEAVIER, MORE RUGGED TRACTOR**

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And a LOW FORD PRICE, too

*Sold Separately

Ford TRACTOR

You must see this new Ford Golden Jubilee Model before you can believe that so much quality and value can be packed into a tractor, at so low a price.

Here is the latest and finest product of Ford Tractor engineering experience that dates from the beginnings of this century. Here are the results of knowledge gained in building over two million tractors, backed by years of field testing.

Here, in short, is the most modern tractor on today's market. It is the most advanced in overall engineering and design. It stands out by any comparison in its ability to do its work well and fast—to do more different kinds of work—to operate smoothly, dependably and economically. It offers a new high in convenience, ease and comfort for the farmers and farm workers who use it.

Best of all, it is a FORD—at a low Ford price! We cannot urge you too strongly to see it at the showroom of your nearby Ford Tractor dealer where it is now on display.

DEARBORN MOTORS CORPORATION • Birmingham, Michigan

National Marketing Organization for the Ford Tractor and Dearborn Farm Equipment

Ford Farming

MEANS BETTER WORK...MORE PRODUCTION

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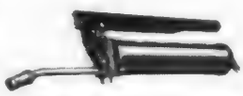
MORE and MORE
Farmers demand ARO
COMPLETE LINE
ARO has the lube-answer for every farm need! Just what you need . . . for faster, better lubrication. Reasonably priced . . . growing popularity! See Your Equipment Dealer. The Aro Equipment Corp., Bryan, Ohio.

"THE HUSKY"—Aro's 10,000 lb. gun. High pressure to crack plugged fittings. One-hand operation. (*Shown above*)

GREASE GUNS and FILLERS

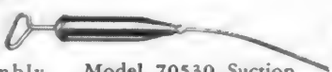
New Model 60032 Farmaster lubricator saves time by delivering more lubricant before recharging. Dispenses from original 25-35 lb. container . . . develops to 6000 lb. pressure. One-hand operation.



Model 2030-F Grease Gun, 1 lb. capacity, low priced, for general farm use.

Model 2643 Grease Gun . . . heavy-duty lubrication.

Aro filler assembly 70963 with nipple used with any hand-operated lubricator . . . extra service as gun filler.



Model 70530 Suction Gun for general use.

Model 60048 Gun Filler, 100 lb. capacity. Loads any hand gun equipped with Aro Filler Nipple.

Complete line of grease fittings. .

LUBRICATORS

Air-Powered High Pressure Lubricator . . . 60 lb. bulk grease capacity . . . will operate off 1 h.p. compressor. Equipped with 10′ H.P. hose.

Double-Duty Lubricator, hand-operated. 30 lbs capacity. Pump develops to 2,000 lb. pressure . . . used as lubricator, or loading hand gun.

High-Pressure Hand-Operated Lubricator . . . pump develops to 5,000 lb. pressure . . . Can be refilled with entire 25 lb. container.

ARO *The Leader* IN FARM LUBRICATORS

Manufacturers of Lubricating Equipment for more than 20 years

FARM BOOKS

***A Veterinary Handbook for Cattlemen,** by J. W. Bailey. The Webb Publishing Company, St. Paul, $5.00.*

When an animal is injured or is sick, the best thing to do is to call the veterinarian and make use of his skill and knowledge. But what if the veterinarian is out when you call, or what if you live in an area, as many farmers do, where there isn't a veterinarian to call? Then you will have to depend on your own knowledge and the life of a valuable animal may hang on how much you know. There have been far too few good books which give the farmer a better understanding of his animals and help him pinch hit for the veterinarian until he can come. Dr. Bailey has done an excellent job of writing to help fill this need. Being both a Doctor of Veterinary Medicine and a writer (many of his articles have appeared in the FARM QUARTERLY) Dr. Bailey is particularly well qualified to write this book.

EMERGENCIES turn farmer into midwife.

The book is arranged to cover general handling of cattle and then broken into sections covering contagious diseases, digestive troubles, mammary troubles, respiratory troubles, skin troubles, nervous troubles, urinary troubles, reproductive troubles, and calf troubles. If these aren't troubles enough he has a catch-all section for such miscellaneous difficulties as lump jaw and foot rot. In discussing specific diseases or troubles, Dr. Bailey gives the cause of the malady, the symptoms which the animal will show, the diagnosis—the positive facts which will determine that the trouble is this specific one — then the treatment, and finally the prevention.

This book, as its title implies, is limited to the diseases and other physical troubles of cattle. This limitation gives Dr. Bailey a chance to do a much more thorough job than if he had tried to cover the whole field of ills and ailments of our farm animals.

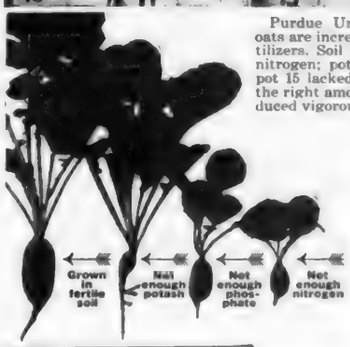
***Grasses and Grassland Farming,** by Hi W. Staten. Devin-Adair Company, New York, $5.00.*

A farmer who is inclined to increase the

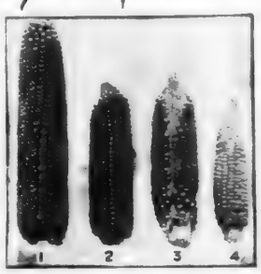
(*Continued on page* 72)

Amazing Tests Help Farmers GET BIGGER CROPS

Purdue University shows how oats are increased with correct fertilizers. Soil in pot 13 was low in nitrogen; pot 14 low in phosphate; pot 15 lacked potash. Pot 16 with the right amounts of all three produced vigorous, healthy growth.



The radish at left compared with the three at right is concrete evidence of the cold-cash benefits of soil testing for every kind of crop. You will have greater size, earlier harvest and high quality in root crops, also lush foliage and vigorous growth of leaf, fruit, vine and grain crops.



Lack of the right fertilizer cuts your profit on all crops, just like corn yields at left. Ear 1 was grown in balanced soil. The stunted, deformed ears were grown in poor soil — (2) lacked nitrogen; (3) needed phosphate and (4) was potash starved.

YIELDS PER ACRE UP TO

225 Bu. Corn — 100 Bu. Wheat — 125 Bu. Oats
30 Tons Tomatoes — 5 Tons Hay — 775 Bu. Potatoes
Increase Milk Production as Much as 300%

You, too, can harvest bumper yields from every crop you plant. With these easy tests you'll get back up to $15 in extra yield, for every dollar spent on fertilizer. Your **Sudbury Soil Test Kit** will pay for itself many times over even the first season. It will guide you not only in planting, but all summer long. You'll keep on getting steady increases for years to come — actually building up your soil instead of draining its vitality.

The U. S. Dept. of Agriculture predicts a constantly increasing demand for years to come and urges more production per acre to supply our country's needs — stressing use of the right fertilizer (indicated by soil testing) as the surest way to increase yields.

Double Your Income — *Cut Expenses Too!*

Soil Tests make every acre pay up to double or triple former yields. Soil experts agree that most farms could produce twice as much — simply by correct fertilization. Sudbury users all over the country report tremendous increases in both yield and quality; like H.C.B. of Ohio who doubled his wheat crop, tripled corn and hay, boosted oats 500%. The Sudbury Soil Test Kit guarantees bigger and better crops.

You not only make more money, you save money — every season your Sudbury Soil Test Kit can save you up to $15 an acre on fertilizer. Guessing wastes both time and money. No one can know what last year's crops took out of the soil without testing. Using the wrong kinds can do more harm than none at all. A farmer in Illinois "guessed" he needed 235 tons of limestone, but tests showed he didn't and saved him $500 which paid for the phosphate really needed on 65 acres. That wrong guess could have cost him more than a dozen Soil Test Kits.

Farmers deLuxe Soil Test Kit

Complete with everything you need for hundreds of tests. More valuable to you than all your stock and tools! Shows the right amounts of nitrogen, phosphate and potash for each field. Also shows whether lime is needed (pH) and how much. Lifetime welded steel chest with carrying handle, weighs only 12½ lbs. Easy instructions and charts show needs of 225 different crops. Order today, big value, low cost — **only $29.95!**

No Knowledge of Chemistry Needed

So simple anyone can use it. Even your first tests will be accurate and reliable. There's no waiting for reports — the correct answer is printed right on the chart. Ready to use anywhere, anytime, even right out in the field. Make "on the spot" tests whenever you wish.

EASY AS READING A THERMOMETER

Takes only 10 minutes, costs less than 10c a test. You'll learn more about your soil than from a lifetime of farming. An indispensable aid to more profits. Ag. colleges, county agents, experiment stations and progressive farmers everywhere depend on it — so will you! Farmers without Soil Test Kits lose many times their cost each season.

300,000 Users Can't Be Wrong

G. H. of Ohio writes "I have made many tests; like its simplicity and accuracy. Worth 1000 times its cost on my 320 acres; found them low in phosphate."

A. F. B. of Iowa increased his bean yield 50% after correcting phosphate deficiencies which his Sudbury Soil Test Kit revealed.

W. L. D. of Pennsylvania saved $400 on fertilizer. "The Kit has paid for itself over and over again," he says.

S. G. H. of Michigan "guessed" his potato field had enough potash but needed nitrogen. Fortunately he tested his soil first and found he was wrong on both counts. He saved the nitrogen, added potash and doubled his yield!

R. S. G. of Indiana tested his soil and discovered potash was badly needed — has increased corn yield 20%!

You Take No Risk

Our Daring Guarantee — We are so certain you'll get bigger yield and better quality with your Kit, we'll refund the full purchase price anytime this year, if you don't.

BETTER CROPS Guarantee

SEND NO MONEY

Order today, C.O.D. **only $29.95** plus postage or send check and we'll pay postage, saving you from $1.26 to $2.93 in postal charges.

FREE BOOK — "Our Land and Its Care"

In addition to saving postal charges, when you send check with your order we also include this valuable 64-page book on farm management FREE.

Also sold on Easy Payments if desired — see bottom of coupon.

SUDBURY LABORATORY, Box 554, South Sudbury, Mass.

Send me the Farmers deLuxe Sudbury Soil Test Kit at the special low price marked below:

☐ Enclosed is $29.95; send postpaid; include free book, "Our Land and Its Care".

☐ Send C.O.D. only $29.95 plus postage.

Name.....

R. D. or St......

P. O...... *Zone*..... *State*.....

☐ Send on Easy-Payment Plan — I'll pay mailman $4.95 plus postage, then 4 monthly payments of $6.75 each.

Hardware, Seed, Grain and Farm Supply Stores: Serve Your Customers by Carrying This Essential Aid to Better Farming. *Write for Special Offer.*

SUDBURY Soil Test Kits

SUDBURY LABORATORY, Box 554, South Sudbury, Mass.

World's Largest Makers of Soil Testing Equipment

STONEMO GRIT

grinds out more nutrients from feed—helps you get

MORE EGGS-MORE MEAT

—leading breeders agree!

Important as feed and water

A. P. Loomis, Honeggers' & Co.
Forrest, Illinois

"Our Honegger Leghorns have it (Stonemo) before them just as systematically as their feed and water supply; and it is always a part of our poultry program recommendations to our many customers."

Best of all tried

Henry Saglio, Arbor Acres Farm
Glastonbury, Conn.

"Stonemo is a very important part of our program. Of all the grits we have tried, nothing does the job so well as Stone Mountain. We're sold on it!"

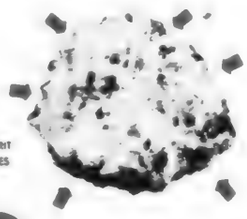
Gets last bit of nutrients

H. A. Richards, Harco Orchards & Poultry Farms
So. Easton, Massachusetts

"We purchase Stonemo by the car and feed it generously in the brooder houses, on the range, and in the laying pens. Stonemo helps to get the last bit of nutrients out of the feed."

Leading breeders everywhere find STONEMO Granite Grit helps get more eggs, more meat from every bag of feed... *helps lower feeding costs!* The extra grinding surfaces of STONEMO grind more nutritional value from feed. Also, STONEMO is insoluble—will not upset careful mineral balance of your ration. Good feed and good grit are your "partners for profits!" Get hard, *insoluble* STONEMO from your feed or poultry supply dealer—in the economy 80-lb. bag—today!

STONE MOUNTAIN GRIT COMPANY, INC.
Executive Offices and Quarry: **LITHONIA, GEORGIA**
Branch Quarry: **BARRE, VERMONT**



COARSE SIZE STONEMO HARD GRIT MAGNIFIED 5 TIMES

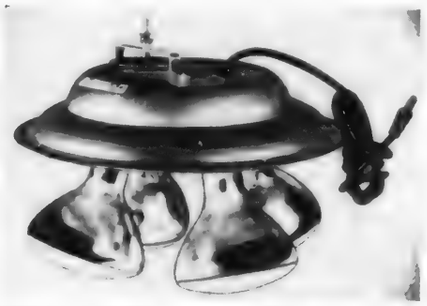
STONEMO the Grit

with the "EXTRA GRINDING SURFACES"

Poultry Yard

A New Feed From Whales The next time the lookout on a whaling ship sings out "Thar she blows!" and the sailors below unlimber their harpoons, they will be after more than fat for soap, whale-bone for corsets, and ambergris for perfume, for researchers at the Western Australia Department of Agriculture have found a way to convert whale into a high protein poultry feed. While the whale meat is being taken from the carcass a by-product, called whale solubles, is recovered, and condensed into a thick, black syrup which supplies all of the animal protein needed in a poultry diet.

Heat Lamp Brooding Infrared lamps which produce a ray which will heat objects by radiation but will not heat the air through which they pass are being used in increasing quantities in poultry brooding. Here are a few facts about the lamp. The infrared light will keep a chick cozy and warm even through the air temperature around it is below zero. Since it does not heat the air but depends on its rays to heat the chick, the infrared lights need no brooder for their effectiveness. One 250-watt heat lamp uses one-fourth kilowatt of electricity per hour. In most areas, a 250-watt lamp, hung a foot and a half above the chick, will take care of 100 of them.



THESE LIGHTS can brood 400 chicks.

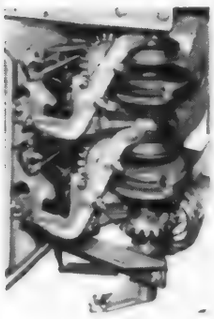
As the chicks grow the bulb is raised one inch each week for six weeks by means of a simple pulley. In warmer areas, 100 chicks may be taken care of by a 125-watt bulb, in colder climates it may take a 350-watt bulb to do the job. A single bulb may be operated from a regular light cord; when batteries of lights are to be used, special wiring is required. Lights may be left on continuously without danger. Litter is kept dry under the lights. Some users claim that feathering is speeded up by infrared brooding.

The Chicken Blood Lines The qualities a chick inherits can make or break a poultryman. When roosters in the flock became fryers rather than

(*Continued on page* 152)

FULL FLOATING PICK-UP

The 52-inch pick-up follows the contour of your land . . . it's spring balanced . . . cushioned against jars and jolts. Rotor shell ends are sealed against wrapping. Vertical, undershot elevator assures smooth, continuous, controlled delivery to auger and chamber. Closed deck prevents leaf damage.



ACCURATE TIEING

The knotter is the result of years of experience in building tieing mechanisms for binders. With its 3 cord disc, twine is held tighter . . . bales tied tighter. Operation is smoother . . . without skips or double tripping. Inverted cams prevent build-up of dust and dirt. All wearing surfaces are carburized to resist rust formation and wear. High speed fan keeps the entire unit clean.

Simpler design gives you Big Baler Capacity AT LOW COST

TIES UNDER COMPRESSION

Spring loaded bale tension is applied to sides of bale. Solid bottom design prevents loss of leaves in short hay. Uniform bales — 14 x 18 x 37 are tied every time. The weight may change, but the size always remains the same. Needles pass through channels in the plunger head — not the hay. There's no lost motion . . . no jerky action to cause unnecessary vibration. Needles are located high on the frame — protected when crossing ditches or rough ground. Shear pin provides additional protection during operation.

MASSEY-HARRIS AUTOMATIC SLICER BALER

ENCLOSED DRIVES . . . OIL-BATH LUBRICATION

The gears in the Massey-Harris Baler are fully enclosed and protected from the wearing action of dust and dirt. Gears run in a bath of oil for positive protection. Shear pin on flywheel cuts off power to the Baler if an obstruction jams the machine.

SIMPLE, improved design in the Massey-Harris Baler puts more precision into every part . . . steps up capacity . . . produces more bales a day, at less cost.

As a result, the Massey-Harris matches the capacity of many larger, heavier units . . . up to 200 bales an hour depending on moisture — 2,000 bales in an average day. Tied under compression, bales are uniform in size . . . 14 x 18 x 37 . . . firm, easy to handle, and load.

Most important, the Massey-Harris Baler handles your hay gently . . . retains more of the high protein leaves . . . reduces threshing and separation in alfalfa and clovers. The completely enclosed body design is added protection against leaf-loss and dust.

Simple design cuts servicing and maintenance costs . . . eliminates unnecessary parts and expense. This means long-life construction . . . less dead weight . . . more strength and durability. It puts the Massey-Harris Baler within range of the average-size farm, giving you all of the advantages of timely baling for better color . . . more of the vitamin and carotene content in the hay.

See your Massey-Harris Dealer the next time you're in town. Get all of the facts on the new Massey-Harris Baler — the big capacity Baler for the average-size farm. For free folder by mail, write The Massey-Harris Co., Quality Ave., Dept. C-222, Racine, Wis.

Make it a Massey-Harris

Parts and Service Through more than 2500 authorized Dealers

Wyeth

TREAT

PNEUMONIA

EFFECTIVELY AND ECONOMICALLY

LONG-ACTING

BICILLIN

GIVES PENICILLIN

BLOOD LEVELS

LASTING A WEEK

OR MORE!

A single injection of Bicillin *L-A* (Long-Acting) produces penicillin blood levels in cattle lasting up to 9 days. (Similar doses of procaine penicillin last only 24 hours.)

In cases of pneumonia in cattle caused by penicillin susceptible organisms, a single injection of Bicillin *L-A* has proved highly effective.

When shipping cattle, Bicillin *L-A* provides protection against shipping fever.

Bicillin *L-A* means economy in treatment because fewer injections are needed—means less handling of animals.

Ask your supplier at once about this new, long-sought-after penicillin compound.

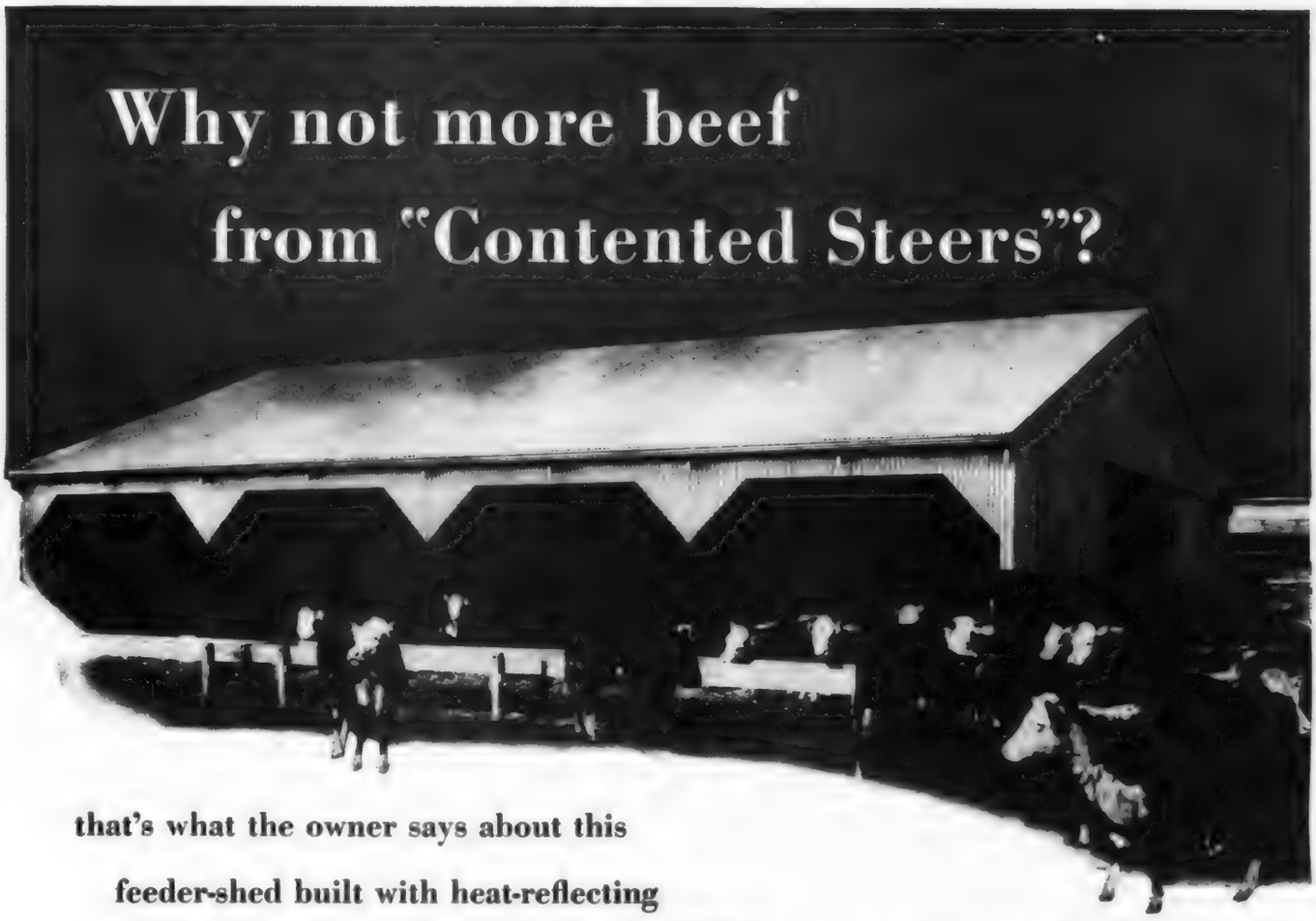
SUPPLIED: 1 cc. Tubex® cartridge containing 600,000 units, with needle.
10 cc. vials of 2 million units (200,000 units per cc.)
50 cc. vials of 10 million units (200,000 units per cc.)

*TRADEMARK

Consult your Veterinarian as you would your Physician.

Wyeth PHILADELPHIA 2, PA.

Why not more beef from "Contented Steers"?



that's what the owner says about this feeder-shed built with heat-reflecting

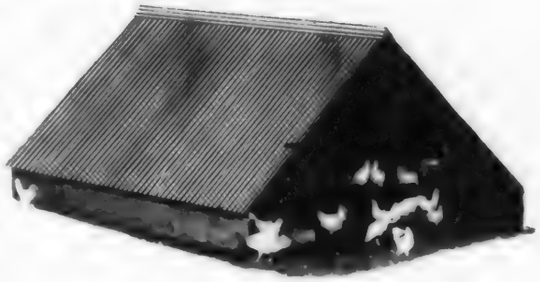
REYNOLDS *Lifetime* ALUMINUM ROOFING AND SIDING

"When my steers head for that cool aluminum shade on a hot day, they're doing it for their own comfort. But *I* figure it means a comfortable increase in weight and profits for me. More beef from contented steers!"

That's what Walter W. Gast says. He farms 220 acres near Aurora Illinois. His 40′ x 60′ barn, above, feeds about 100 head of cattle. And is he proud of it! Low-cost, pole-frame construction . . . but look at the details. Reynolds *Lifetime* Aluminum Gutters on both sides. And that facing over the poles is really handsome.

"You might mention more contented farmers, too," continues Mr. Gast. "That aluminum will never rust, never need painting. I've got a lifetime investment that will keep paying *me* back!"

Whatever buildings *you* are putting up, aluminum is your answer. Military needs may limit present supply, but Reynolds production is rapidly expanding. Keep asking your dealer. **Reynolds Metals Company,** Building Products Division, Louisville 1, Ky.



HEAT-CONTROL HELPS *ALL* LIVESTOCK AND POULTRY, TOO!

Milk yield goes down drastically as temperature rises. The amount of feed it takes to put a hundred-weight on a hog goes up tremendously. And in poultry, excessive heat not only cuts egg production and broiler gain . . . it can *kill* the birds. Put heat reflecting aluminum on *all* farm shelters!

REYNOLDS ALUMINUM

SEE "MISTER PEEPERS," starring Wally Cox, Sundays, NBC Television Network. **HEAR "Fibber McGee and Molly,"** Tuesdays, NBC Radio Network

"EATON 2-Speed Axles

are a must in our kind of farming"

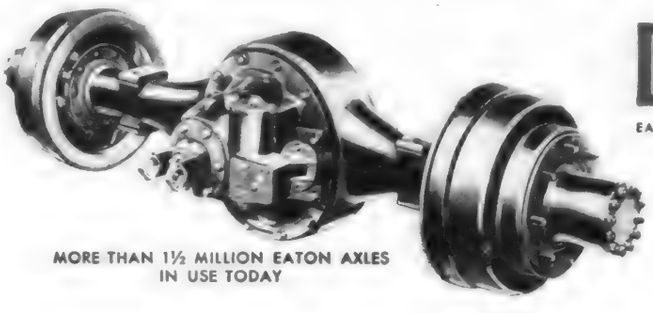
—says Kentucky cattleman

SMOOTHER RIDING FOR SHOW CATTLE — State champion Hereford, "Miss Heir 20," is one of the valuable show animals at Brookview Farms. Herdsman B. Hardiman (*left*) and driver Ray Brown deliver their cattle to shows in perfect shape because Eaton 2-Speed Axles provide transportation that prevents injury and bruising. Eaton's low-range gears eliminate jerky, jolting starts. Cattle can be eased over rough spots slowly and gently.

"We feed over 500 head of registered Herefords on our 2,400-acre farm," says J. D. Gay, Jr., owner of the well-known Brookview Farms. Pine Grove. Kentucky. "When harvest time comes around, it takes Eaton Axles to get the heavy loads out of the fields—that's one big reason why our three GMC's are Eaton-equipped.

"And another reason: the prize cattle we carry hundreds of miles to shows have to be handled with care. Eaton 2-Speeds enable us to ease these animals over rough roads smoothly and without bruising. We often haul cattle over 500 miles. The saving we make in time and gasoline is important." An Eaton 2-Speed Axle gives any truck the flexibility a farmer needs for this kind of hauling. Low-range gears provide the extra pull for hauling heavy loads over soft ground and rough roads. High-range gears make possible time-saving, gas-saving speeds on highway runs. Ask your truck dealer for a demonstration.

"FARMERS NEED EATON AXLES," says Mr. Kittrell (*right*), head of Kittrell Motor Co., Inc., GMC dealers of Lexington, Ky. "We've sold hundreds of Eaton-equipped GMC's in the past 5 years to contract tobacco haulers and farmers. These fellows really need them. Eaton Axles have an excellent service record and an Eaton-equipped truck always has a plus trade-in value." J. D. Gay, Jr., well-known cattleman, owns two Eaton-equipped GMC's that are 15 years old. "Never spent a nickel on axle repairs," he says.



MORE THAN 1½ MILLION EATON AXLES IN USE TODAY

EATON

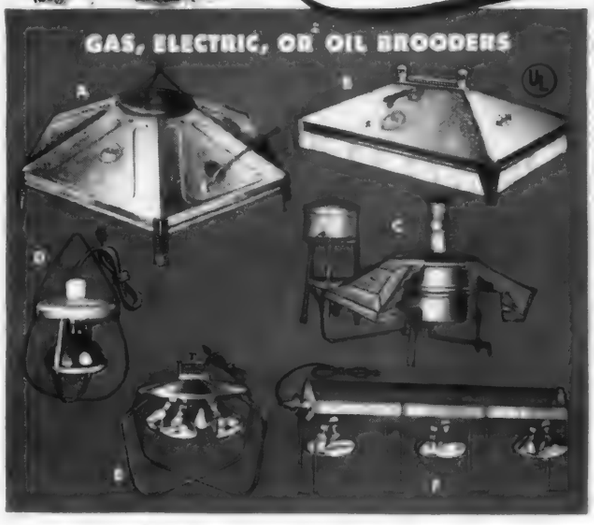
EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

2-SPEED *Truck* AXLES

● America's highways, designed for twenty-year-ago traffic, are far behind our needs and dangerously crowded. More and better highways will help get farm products to market at less cost in time and dollars.

Let Hudson Help with your Poultry Chores!

Efficient, Low Cost help with
HUDSON CAREFREE FEEDERS, FOUNTAINS, BROODERS.
Save you time and money . . . give you better chicks!



A. Hudson-Hart® Gas Brooder. Self-cleaning burner. Clay radiants spread heat uniformly. Sensitive valve, automatic thermostat. 500, 750, 1000 chicks.

B. Hudson Lektrik-Hen® Brooder. Completely automatic. Powerful radiant elements. Balanced heat distribution keeps litter dry, prevents huddling. Fully insulated. 100, 300, 500 chicks.

C. Hudson Mother-Hen® Oil Brooder. Save up to 30% on fuel with "Oil-Miser" burner. Needs no cleaning between broods. Micro-Tem® valve gives constant heat control. 500, 750 chicks.

D. Single-Bulb Infra-Red Brooder. Ideal for small broods of chicks, for pigs, lambs, and other heating needs. With guard, as shown.

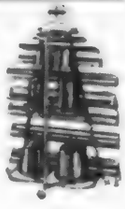
E. 3- and 4-Bulb Infra-Red Brooders. 4-bulb model with guard as shown, or without guard, has thermostat control on 2 bulbs; handles about 300 chicks, 3-bulb model handles about 250 chicks.

F. 6-Bulb Infra-Red Brooder. Will brood about 500 chicks. Thermostat control on 3 bulbs. 48-in. heavy-gauge metal fixture for 6 bulbs. Complete with guard, as shown.

A. Hudson Lektrik-Hen® Battery. Available in 2 sizes—with 1 to 5 decks (123 or 247 chicks per deck). Stack perfectly. 150-watt element.

B. Hudson Lektrik-Chik® Brooder. Full size—moderately priced. Holds 123 day-old chicks. Stacks perfectly to make 2 to 5 deck battery. 150-watt element.

Choose from this display at your Hudson Dealer



A. Hudson Chick Feeder. One-piece enamelled steel. No seams, easy to clean. 3 sizes: 18-in., 24-in., 36-in. with non-roost reels.

B. Adjustable Chick Feeders. Hudson-designed legs easily snap to 3 heights—no nuts or bolts. 4-blade non-roost, free-spinning reel. 36-in., 48-in. sizes.

C. Large Adjustable Broiler Feeder. 48-in. with reel adjustable to 3 positions, or with grill. Legs snap into any of 3 positions.

D. Jumbo Size Broiler Feeders. 5 ft. long with grill as shown or 4 ft. long with non-roost reel. Adjustable legs fold under trough or stand upright.

E. Hanging Feeder. Holds about 45 lbs. Pan adjustable to 4 positions.

A. Trough Waterer. Foolproof, automatic valve. As water is consumed, valve opens to let water flow. 4-qt. capacity for 500 chicks.

B. Sanitary Chick Fountains. Individual cups in pan keep chicks from wading. Fills twice as often, keeps water fresh. 1 or 2 gals.

C. Growing Flock Fountains. Special saucer pan prevents wading. Easy to clean, fill, and carry. Can be used as pail. 3 or 5 gals.

D. Double-Wall Fountains. No gushing or overflow. Special pan prevents wading, keeps water clean. Ruggedly built. 3, 5, 8 gals.

®TRADE MARK

SIGN OF THE BEST BUY

H. D. HUDSON MANUFACTURING CO.
589 E. Illinois Street, Chicago 11, Illinois

HUDSON
Tested and Proved
POULTRY EQUIPMENT

Please send booklet on Hudson Poultry Equipment.

Name .....

Address ..... or R.F.D. No. .....

Town ..... State .....

My Dealer is .....

FQ-553

DOW

SAVE 50% OR MORE ON FENCE POST REPLACEMENT COSTS

PENTA treatment makes wood posts last 2-4 times longer, saves labor, cuts repair costs

The Dow Chemical Company
Dept. PE 3-5C1, Midland, Michigan

Please send free of cost the information checked below

_____ Booklet, "Post Preservation Pays."

_____ Booklet, "Before You Build Your Barn."

_____ Location of PENTA treating plants.

Name_____

Address_____

City_____ State_____

Here's a better way to safeguard your investment in fencing. Use PENTA*-treated wood posts, and your fence will last for many extra years—in many cases post life will be increased ten to fifteen years.

PENTA is the *clean* easy-to-use wood preservative that positively controls decay and termite damage. By making wood last longer, post cost is cut and your time and labor saved—a total saving of 50% or more on fence post replacement. More and more farmers are finding that PENTA-treated wood for posts and other farm construction makes more profitable farm management.

Ask your lumber dealer for PENTA-treated posts the next time you buy or, if not available, treat your own posts. Complete instructions are included in Dow's informative booklet, "*Post Preservation Pays.*" Write Dow today for complete information about *PENTAchlorophenol and its many applications on the farm. THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW CHEMICALS

DOW

New Idea No. 40, Semi-Mounted Mower. Retractable rollers take lift and strain out of hitching and moving. Multiple-hole hitch plate has 3 up and down positions. Eccentric cam to lock pitman straps. Spring balanced lift for raising cutter bar.
(New Idea No. 45-G Side-rake and Tedder working in background.)

This mower talks . . . listen

Machines talk to those who know the language. An expert mechanic, listening to an engine, can tell you in a few minutes whether or not it's a "sweet-running," precision-built machine . . . or just another engine.

When it comes to mowers, you're the expert. You know mowers, you grew up with them. You know it takes a tough frame, proper alignment, close tolerances to stand up under hundreds of acres of heavy punishment.

Listen to a NEW IDEA Mower. It *sounds* solid. It *sounds* sharp, smooth, strong. Like any expert, your eyes help your ears. You see how a NEW IDEA Mower hitches and unhitches quickly, easily . . . cuts clean on square corners, without strain on power drive. You see that it tracks straight and true . . . cuts cleanly through thickest, toughest hay, acre after acre.

To what you see and hear, add the fact that NEW IDEA has a history of making rugged, durable machines. You'll know why thousands of farmers, who own NEW IDEA Mowers, say that a NEW IDEA is a *good* idea.

New Idea No. 30-AH Trailer Mower. "Easy on-easy off." Gears run in oil bath. Crankshaft mounted on tapered roller bearings. Hydraulic control or mechanical lift. Equalizer arm takes strain off universal joints on sharp turns.

Mail coupon today for free folders

NEW IDEA DIVISION AVCO DISTRIBUTING CORPORATION
FARM EQUIPMENT CO.
Dept. 706, Coldwater, Ohio

Send free folders as checked:

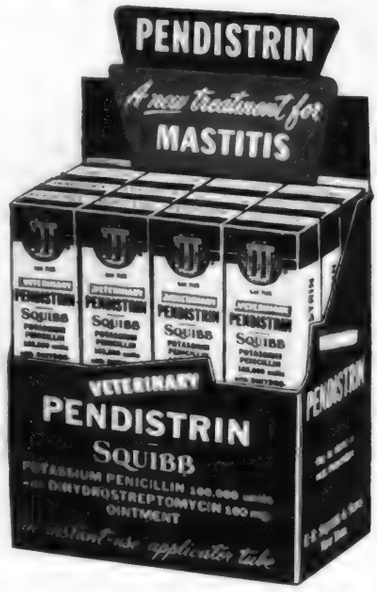
- ☐ Tractor Mowers
- ☐ 4-Bar Rakes & Tedders
- ☐ Hay Loaders
- ☐ All-Purpose Elevators
- ☐ All-Steel Wagons
- ☐ Steel Wagon Boxes
- ☐ Manure Spreaders
- ☐ Lime Spreaders
- ☐ Stalk Shredders
- ☐ Corn Pickers & Snappers
- ☐ Corn Shellers
- ☐ Transplanters
- ☐ Hydraulic Loaders & Attachments

Name_____

Address_____

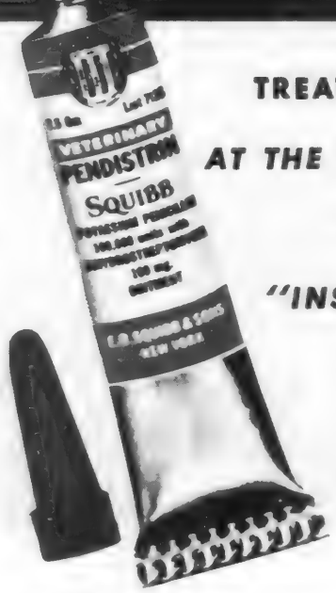
FOR MORE EFFECTIVE CONTROL OF MASTITIS

Keep this "barn box" on hand for ready use!



SPECIAL OINTMENT BASE OF PENDISTRIN® ASSURES

- **THOROUGH PENETRATION**
- **PROLONGED ACTION**



TREAT MASTITIS *AT THE FIRST SIGN* WITH THIS *"INSTANT-USE"* TUBE!

Be prepared to treat your cows promptly—and effectively—at the first sign of mastitis. Get this handy "barn box" of Pendistrin . . . keep it right in your milking barn for instant use. It requires no refrigeration.

Pendistrin is highly effective for treating virtually all kinds of bacterial mastitis . . . particularly the difficult cases.

The special "carrying agent" of Pendistrin penetrates the treated quarter quickly and thoroughly . . . disperses two powerful antibiotics throughout the glandular tissue.

Then the ointment base stays on the job up to 48 hours . . . releases the antibiotics slowly. Organisms are attacked during their life cycle when most susceptible to antibiotic action.

Each tube of Pendistrin contains 100,000 units of penicillin *plus* 100 mg. of dihydrostreptomycin—a highly potent combination. Antibiotics are held in complete suspension—will not settle out.

Pendistrin is stable, non-irritating. Available at your druggists'—in convenient "instant-use" tubes.

Get handy "barn box" from your druggist!

The special barn box makes it easy for you to keep Pendistrin on hand—ready for prompt, effective treatment. See your druggist today for a barn box of 12 tubes of Pendistrin—the proved treatment with the special ointment base!

Send for free folder, "Effective Control of Mastitis." Write: E. R. Squibb & Sons, Veterinary and Animal Feeding Products Division, Dept. FQ-S, 745 Fifth Avenue, New York 22, New York.

For the most common kind of mastitis — get "barn box" of SQUIBB PENICILLIN OINTMENT

For mastitis caused by *Streptococcus agalactiae*—the cause in 8 out of 10 cases—treat with Squibb "Instant-Use" Penicillin Ointment. Proved successful on millions of cases over 4-year period. Get "barn box" of 12 tubes from your druggist.

For accurate diagnosis of mastitis, consult your veterinarian.

SQUIBB — A NAME YOU CAN TRUST

PENDISTRIN is a trademark.

Packed with New Value
and Rarin' to Prove It!

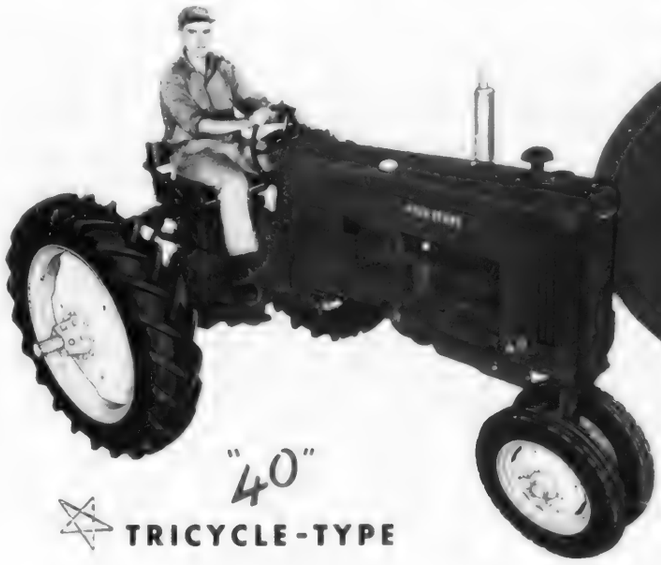
Get Acquainted with a NEW "40" on Your Own Farm.

The new John Deere "40" Series Two-Plow Tractors are so *new* and *outstanding* in their performance that only a test drive can tell you what they're like. First of all, the new General-Purpose models, successors to the John Deere "M" Series, bring you John Deere's advanced type, heavy-duty 3-point hitch with distinctive new Load and Depth Control for a big variety of matching Quik-Tatch working tools. Coupled with these practical advancements are 15 per cent more engine power . . . "live," high-pressure Touch-o-matic hydraulic control . . . new ease of getting on and off . . . new comfort and convenience for the operator . . . new swinging drawbar . . . new easy-to-clean radiator grille . . . and many others.

★ "40" STANDARD

JOHN DEERE
QUALITY FARM EQUIPMENT

JOHN DEERE "40" SERIES TRACTORS

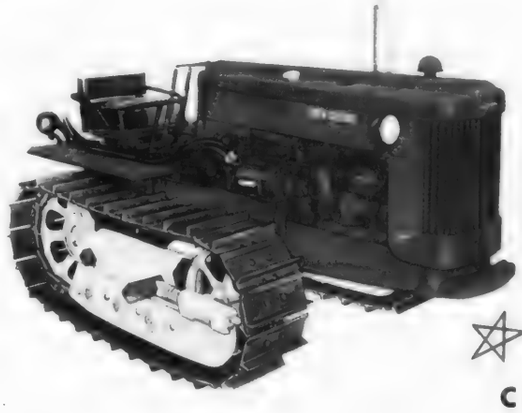


★ "40" TRICYCLE-TYPE

The "40" Tricycle-Type is furnished as shown, also with single front wheel, or with wide front axle. The "40" Standard Tractor (above right) has adjustable wheel treads front and rear. The "40" Crawler (below) is the 2-3-plow tractor for difficult conditions. All three models have the same dependable, economical John Deere-built engine.

We at John Deere are proud of these new models, and of the big new line of modern, quality-built Quik-Tatch working equipment. Check this partial list of tools, many of which interchange with tools for other tractors having standard 3-point hitch:

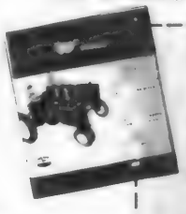
- ★ Plows of all types
- ★ Listers—middle-breakers—bedders
- ★ Planters and drills
- ★ Fertilizing and side-dressing attachments
- ★ Disk Harrows
- ★ Disk Tillers
- ★ Cultivators
- ★ Field Cultivators
- ★ Spring-Tooth Harrows
- ★ Tool Carriers
- ★ Tool Bars
- ★ Rotary Hoe
- ★ Subsoilers
- ★ Scoop
- ★ Mowers
- ★ Fork Lift
- ★ Loaders



★ "40" CRAWLER

SEE YOUR JOHN DEERE DEALER

Send for Free Literature



JOHN DEERE · Dept. B-54 Moline, Illinois

Please send me literature on ☐ "40" Wheel-Type Tractors ☐ "40" Crawler.

Name_____

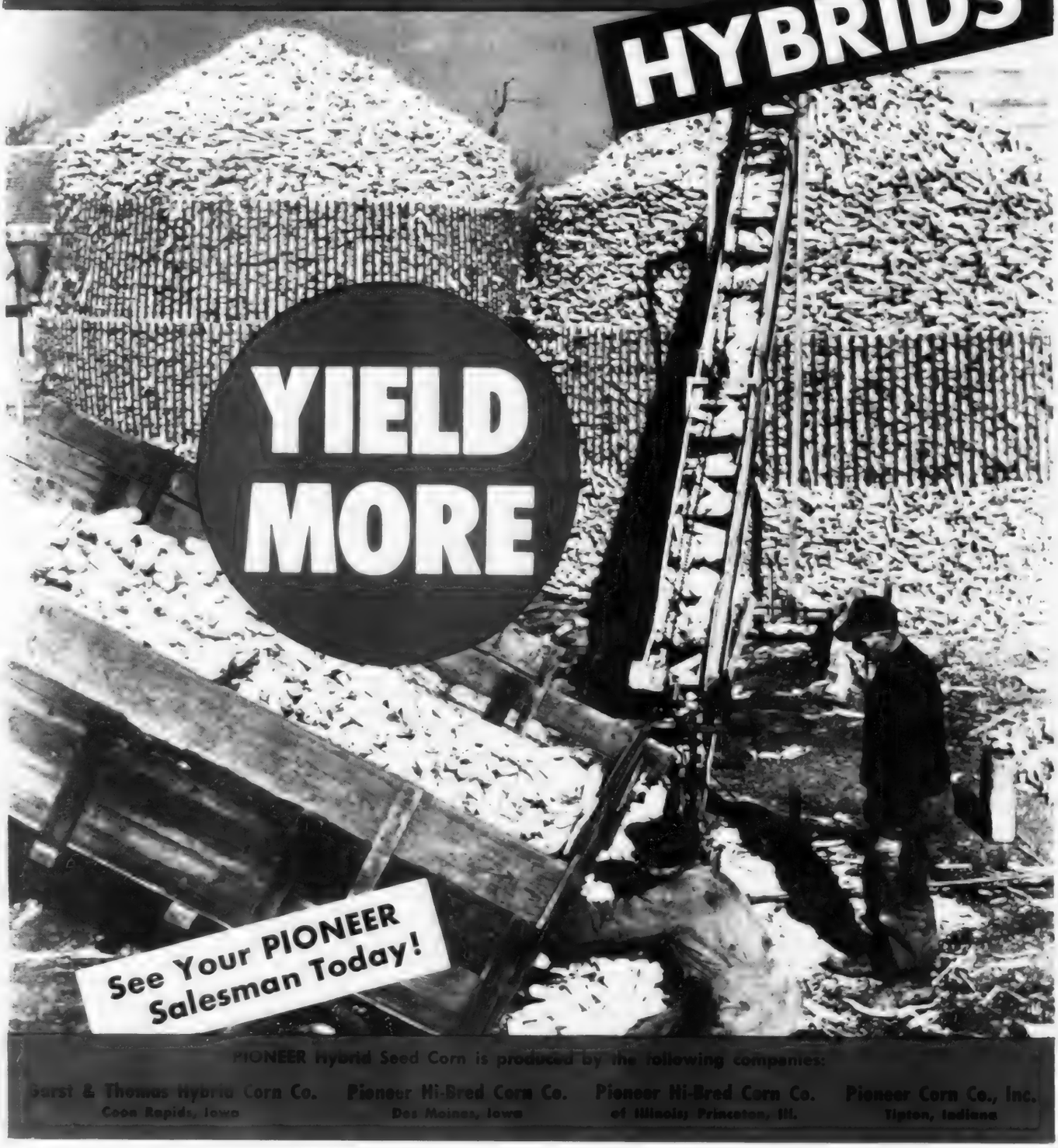
R. R._____ Box_____

Town_____

State_____

PIONEER

HYBRIDS



PIONEER Hybrid Seed Corn is produced by the following companies:

Garst & Thomas Hybrid Corn Co.
Coon Rapids, Iowa

Pioneer Hi-Bred Corn Co.
Des Moines, Iowa

Pioneer Hi-Bred Corn Co.
of Illinois; Princeton, Ill.

Pioneer Corn Co., Inc.
Tipton, Indiana

ALLIS-CHALMERS FORAGE HARVESTER

Of all coming crops, the most promising are soil-building forages. Captured at their peak of goodness with a home-owned Forage Harvester, green silo crops preserve all the leafy nutrition, flavor, and succulence that nature puts into the growing plant.

Rain? Let it come. Dampness that once spoiled tons of hay is solved at last. Sunny weather is not needed, because curing is done in the silo.

Drouth? You're ready. Keep a reserve store of nutritious silage . . . a feedbank you can always draw on. No more buying feed or sacrificing livestock when pasture dries up.

For every forage from spring-blossoming legumes to frost-nipped corn or sorghum, your own Forage Harvester is ready to move . . . fast!

All-'Round
CROP SAVER

Save it all. The Forage Harvester field-chops tall row crops, standing green forage, windrowed dry hay, wilted hay for silage or haymow drying, and windrowed straw following the combine. Clips stubble and pasture. Chops dry forage for bedding.

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CORN *can build* SOIL FERTILITY

By Aaron Baxter

CORN can be a soil building crop or it can be the wrecking bar that tears down soil tilth and fertility. It all depends on how you grow it.

Well fed corn can add to the soil humus while producing a profitable 100 bushels of grain or more per acre. Corn producing 100 bushels per acre returns to the soil several times as much plant residue as sparsely populated, undernourished corn.

Yontz Bonnett, a grain farmer of McLean, Illinois, has been growing corn on the same land for five consecutive years and at the same time increasing his soil productivity. After several changes—always to higher applications of plant food—his system consists of plowing down 600 pounds of ammonium sulphate balanced with phosphate and potash. The composition of this fertilizer varies from time to time but it contains about the same plant food as 1300 pounds of 10-10-10, and is applied and plowed down in the fall with the stalks which are shredded shortly after the corn is picked. By spring the stalks have been so completely converted to humus that only a trace of them remains. In addition, another 200 pounds of 3-12-12 is applied in the row at planting time.

Corn yields on Bonnett's farm have consistently increased from 100 bushels in 1948 to 138.7 bushels per acre in 1951. His 1952 yield dropped to 125 bushels per acre due to drought at a critical stage in corn growth. This gives him an average of 117.5 bushels per acre for the five years.

Fertility Makes a Difference

Some soil conservation men point with pride to the tons and tons of soil saved by following long rotations which include corn only once in five or six years. They ignore the fact that corn can be a soil improving crop or a soil depleting crop—depending largely on how it is plowed, fertilized, planted and managed.

THIS NEW CORN TOOL is side-dressing corn that is six feet high, using a high-nitrogen fertilizer. With this tractor on stilts the corn is never "laid-by"; it can be worked, fertilized or sprayed any time during the season.

They often ignore the fact that more corn in the rotation means more profit to the farmer.

Of course, corn, like any row crop, should not be planted up and down slopes where soil is likely to be lost by erosion. On rolling or slightly sloping land, rye grass or other winter cover crops planted at the last corn cultivation are proving effective in preventing winter erosion. Well fertilized soil is essential in obtaining stands of cover crops in corn. A striking example of this is shown in plots established by the Vocational Agriculture Department at Slippery Rock, Pennsylvania. Where only a row application of 350 pounds of 10-10-10 was applied the rye grass stand was poor and furnished little protection by corn harvest time. On the other hand, where 1,000 pounds of 10-10-10 per acre had been plowed down in addition to the row application a luxuriant shoetop-high growth of rye grass covered the plot. In addition, thicker stands of larger, well fertilized corn forms a much more effective soil protecting canopy during the growing season than corn as it is ordinarily grown. Soil erosion is greatly reduced.

Soils Must Hold Water

With our present know-how in corn production, the most important property needed in soil for corn growing is water-holding capacity. The plant food necessary to produce a big corn yield can be applied in commercial fertilizers. Lime requirements can easily be met. Even soil tilth can be improved if necessary. However, soil texture (size of soil particles) is fixed and there isn't much that can be done about it. If you don't get the rain, say 15 to 20 inches well spaced through the growing season, you won't get maximum corn yields. It takes this much in addition to that stored in the soil from rains ahead of planting time.

Soil texture determines to a large degree how much water an acre of land will be able to deliver to the growing corn.

Sandy soils being porous much of the water percolates through them and not enough is held to support a large corn crop. On the other hand, the heavy clay soils are not too well adapted to corn since they do not drain readily.

NEW SILAGE HYBRIDS can add tons to the winter feed supply. They are bred to grow ten feet or more high and provide better than average protein content.

The intermediate or loam soils are best for corn. The water holding capacity and the organic matter content of the soils are the chief reasons why Iowa and Illinois are thought of as the Corn Belt. These in-between soils, such as the silt loams, can hold more water for delivery to the growing corn plants than either the sandy or the clay soils. However, the addition of large amounts of organic matter, such as cornstalks from 100 bushel corn, will do much to improve the drainage and water relations of heavy clay soils. Not much can be done to improve the water holding capacity of sandy soils.

Soils release some plant foods each year from the chemical breakdown of soil particles. Some phosphorus, potash, calcium, and other minerals are released in this way and made available for crops. With the exception of soils in the western end of the Corn Belt and certain other localized spots, the amount of plant food released is a small drop in a large bucket when compared to the requirements for 100 bushel corn. Profitable corn is made at the upper end of the yield ladder and you can't get there by trying to squeeze the last ounce of nitrogen, phosphorus, and potash out of the soil.

Plant foods must be added generously but not wastefully. Good fertilization of corn must include the application of at

least enough of the different plant foods to produce a big yield—and corn is a hog about nitrogen, phosphorus, and potash. This fact is illustrated in the new film produced by the National Fertilizer Association, called "Cash In On Corn." The animated ear of corn, bearing a striking resemblance to a hog, gobbles up 130 pounds of nitrogen, 55 pounds of phosphoric acid, and 120 pounds of potash, the requirements for 100 bushels of corn.

This film points out that after allowing for phosphate fixation, a 100 bushel corn crop uses the amounts of plant food supplied by either 1500 pounds of 8-8-8, 1200 pounds 10-10-10 or 1,000 pounds of 3-12-12 plus enough straight nitrogen material to supply 100 pounds of actual nitrogen.

There are few fields where the soil can supply these amounts of plant food during the growing season of corn. Most soils just can't do it because plant foods have been removed through long years of cropping without returning the materials removed. There is one way to get the plant foods back on a large scale, practical basis, and that is with commercial fertilizers.

Nitrogen Is a Necessity

If there is one most essential plant food for corn, that one is nitrogen. There is no

IN SOUTHERN MICHIGAN Andy Shugars and Jim Howe decided to plant their corn on the furrow several year ago. Using two tractors, one pass over the field turned it into a corn field. Right, Jim Howe looks over the sprouts a week after planting. Over the last two years their yields are up; they made 75 bushels last year. Several trips over the ground are saved and the land holds the moisture better.

widely used soil test for nitrogen. Since most soil nitrogen is contained in organic matter a test for the amount of organic matter contained in soils can be valuable in making sure sufficient nitrogen is available for the corn crop. Such a test is available and can be run fairly rapidly by the soil testing labs. There are also plant test kits put out by Jim Bray, Edwards Laboratory, LaMotte Chemical and Sudbury Laboratory. With these kits the growing corn itself can be tested to see if it is getting enough Nitrogen.

Dr. Fred J. Salter and E. P. Reed, Agronomists at Ohio State University have developed the Nitrogen Work Sheet shown below. This table, together with results of an organic matter test, can be used to make sure that enough nitrogen is applied for the corn yield you wish to produce.

Three divisions of the charts show that there are three sources of nitrogen other than commercial fertilizers. These are (1) Soil, (2) Sod and residues plowed down,

(*Continued on page* 152)

NITROGEN NEEDED FOR A SPECIFIC CORN YIELD

Nitrogen Supplied by Different Soil Types

Soil Types Texture Check	Pounds of Soil per Acre	Pct. Organic Matter from Soil Test	Pounds of Organic Matter/Acre	% Nitrogen in Organic Matter	Pounds of Nitrogen per Acre	Percent Nitrogen Available	Pounds of Nitrogen Avail./Acre	Pounds of Nitrogen Needed/Bu.	Bushels Expected
Sandy	*2,000,000*			*5*		*5.0*		*2.5*	
Silt loam	*2,000,000*	3	60,000	*5*	3,000	*2.5*	70	*2.5*	28.0
Clay-like	*2,000,000*			*5*		*2.0*		*2.5*	

Nitrogen Supplied From Legumes, Grasses and Crop Residues

Residues Plowed Under *Good sods, alfalfa-clover-grass*		*4000*			*1.5*	*60*	*2.5*	
Fair sods, clover-grass	√	*2000*			*1.5*	30	2.5	12.0
Poor sods, mostly grass		*1000*			*1.5*	*15*	*2.5*	
Straw, stalks, mature grass		*3000*			*—1.0*	*—30*	*2.5*	

Nitrogen Supplied From Manure

Tons Applied per Acre	Nitrogen per Ton		Pounds in Manure	Percent Available	Pounds Available/Acre	Pounds Needed/Bu.	Bushels Expected
	Protected	Open-Lot					
	10 lbs.	*6 lbs.*		*50*		2.5	

Desired yield per acre, bushels	125
Yield expectancy from above sources	40
Deficit in desired yield	85
Pounds of Nitrogen needed per bushel	*2.5*
Pounds of Nitrogen needed in fertilizer	212.5

Yield in Bushels per Acre from Nitrogen Sources Above	40.0

Bulk Cooling Tanks are Taking the Heavy Work out of Dairying. They are Good News for Any Farm with Twenty Milkers or More.

MILK THROUGH A HOSE

By Fred Knoop

IN THE Washington, D. C., milkshed, which includes Maryland and Virginia, there are 120 cold wall bulk milk tanks in farm milkhouses. That means that dairymen have put out roughly $360,000 to install these big stainless steel tanks and their cooling machinery during the last two years.

What has caused this excitement about a new idea in milk handling? What has made a dairyman with a well-equipped milkhouse willing to put out $2,000 to $4,000 for a new piece of equipment?

The answers lie partly in the kind of dairymen that you'll meet when you drive through the rolling country in which these dairy farms are situated, and partly in the aggressiveness of the big, well-organized dairymen's association, the Maryland and Virginia Milk Producers Association, Inc., for this Association has molded the farms into a group of highly-efficient milk factories. With the farm help problem getting worse these farmers often have to replace labor with equipment that requires a sizable capital outlay. When a new idea comes along that is good for quality improvement and efficient production, the Association jumps on it like a duck on a Junebug.

A mile east of Gaithersburg, Maryland, McKendree Walker and his two sons, Ralph and Grover, put in one of the first bulk tanks when the Gaithersburg milk route was started. As you walk into the milkhouse with Ralph Walker you have a feeling that something is missing. All you see is a big tank standing in the middle of the room. It's mounted on heavy legs made of pipe. Walker uses a 300 gallon tank made by Mojonnier. The surface on the rounded bottom and flat ends is unbroken by any dirt collecting seams. The top is made of two flat sheets of steel interrupted only by two round holes with covers. These holes are for the milk strainers. On the Walker farm the milk is poured directly from the milking machine pails into the strainers which open into the tank. On the bridge over the center of the tank is a completely enclosed geared motor. "It drives the agitator paddle down in the tank," says Ralph in response to your hand rubbing the smooth surface of the aluminum-encased motor.

If this tank has any activity going on inside it doesn't show it. It's only connections with the outside world are a couple of copper pipes and a BX cable leading out of the room. So you ask Ralph if there is milk in the tank. "Sure, take a look in one of those lids; there's over 100 gallons from tonight's milking. We'll put another 100 in it in the morning, before it is hauled away." Then just to prove what's going on inside he drops a dairy thermometer in the milk. Reading it a minute later he announces, "It's a little under 37."

"Don't you get ice around the inside next to the coils when you keep it that cold," we asked.

"Not with the paddle running at the same time that the cooling is taking place," says Ralph. "It cools a tank of milk down to 36; by the time we get through milking the temperature is down. The insulation is so good that the com-

A BULK COOLING TANK eliminates lugging heavy milk cans. Doris Smith, the daughter of Alton Smith, whose farm is near Walkerville, Maryland, is straining milk directly into the 300 gallon cooling tank.

THIS IS A PICTURE of a dairyman relaxing, while 200 gallons of milk are being loaded for shipping to Washington. Tallmadge Watkins, left, is the dairyman; his farm is near Cedar Grove, Maryland. Gerald Arnold, right, owns the 1800 gallon stainless steel tank truck. Once a day he picks up the milk, pumping it out of the bulk cooling tank through the plastic hose. Before each pump-out starts an accurate measure of the milk in the tank is taken and a sample for butterfat.

pressor hardly ever runs again during the night."

A look through the open door into the washroom and you discover what it is that is missing in this milkhouse . . . there are no cans. A small sanitizer box with teat cups and hoses, kettles and milk strainers in it is all that is left of the big wash-up job. That means no dirty cans tossed off the truck every day, and no rusted-through cans to replace at $10.00 a throw. "And no 110-pound cans of milk to 'rastle around with," adds Ralph Walker, "there is going to be a lot less Sloan's Liniment used on farms that have these tanks."

Bulk milk handling is new and the details vary in different parts of the country. On these Maryland farms the volume of milk is big. The average dairyman milks about forty cows. Only one out of a dozen farms on the route has a milking parlor. That's on the Garrett farm, and it's a beauty, with all the walls in buff colored tile. Here the milk goes directly from the DeLaval milking machines through overhead glass lines to a vacuum releaser which is anchored to the wall just above the bulk cooling tank. From the large glass cylinder of the releaser it drops down and is pumped into the tank by a stainless steel, sanitary milk pump.

On all of the farms on the Gaithersburg bulk milk route the milk is picked up every morning after milking. The big tank trucks that pick up the milk are owned by an independent trucker and the dairymen pay for having their milk hauled in the tank just as they used to pay for having the cans hauled. The stainless steel tanks for trucks are made in sizes from 1,500 gallons up to 3,000 gallons in big trailer-type tanks. These tanks are insulated but not refrigerated. Milk at a temperature in excess of 40 degrees upon arrival at the plant is rare. The size of the tank is more or less dependent on how good the roads and lanes are in the area in which the trucker has to operate.

The Smaller Route

Gerald Vogler of Route One, Piqua, Ohio, bought his stainless steel tank about a year ago and had it installed on a 2½ ton Dodge chassis. Then he also had a tandem axle and a set of double tires put on the truck. So far he hasn't had this 2,000 gallon pickup tank stuck on a snowy lane. Vogler figures he has about $12,000 invested in the truck and tank. At the present time he hauls from seven farms of which the most distant one is 45 miles from Dayton. He hauls milk to Borden's in Dayton. He collects milk every other day and is hoping that soon there will be enough bulk tanks installed in the area to make up another milk run, which he would make on alternate days.

The first thing Vogler does is to back the rear end of his truck up as close as possible to the milkhouse. Then he opens the back door of the tanker and pulls out an electric cord. This he connects to the 110 volt current inside the milkhouse to drive the milk pump on the back of the

truck. Going back inside the milkhouse Vogler starts the agitating propeller in the milk tank to stir up the milk well before he takes a butterfat sample. Then he pulls out the long Tygon plastic hose, uncaps the end of it and connects it to the bottom of the bulk tank inside the milkhouse. By this time the milk is well mixed up and Vogler takes a sample of it which he places in a small bottle carried in the back of his truck.

Then the calibration stick is pulled out of the tank and the number of inches read off on it. Each tank is calibrated individually and from the special sheet which has been made up for the tank it is possible to find how much milk is in the tank. "I can come within three pounds of the amount of milk that is in the tank with the calibration sheets," says Vogler. "None of the farmers feel that they have ever been short-changed yet. In fact most of them have been surprised because they seem to be getting better butterfat tests and selling more milk with the bulk system. They are! Over a year's time the savings made possible by bulk handling would amount to quite a bit because there is no spilling in pouring out of cans and the butterfat never sticks to the neck or lid of the milk can.

"I also take a sniff in the milk tank to see if there is any garlic or off-odor," says Vogler. "So far we haven't had any bad milk, but if we did have we would pick it up later as a separate batch." Depending on the amount of milk, the pumping takes from five to ten minutes. As soon as Vogler finishes he flushes out the tank and pipes with cold water, and washes down the floor with the hose.

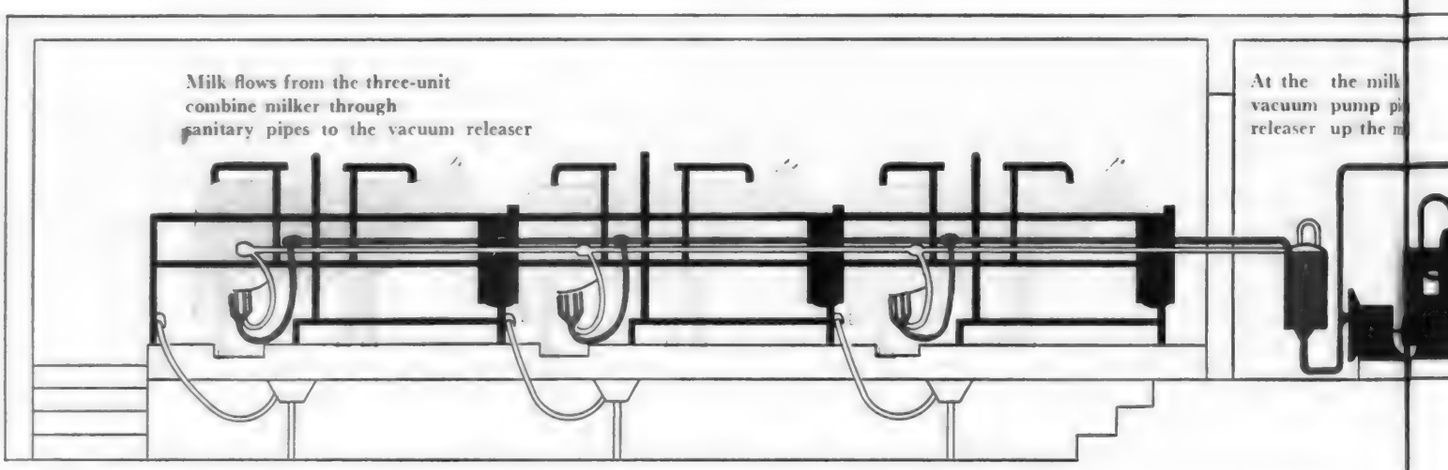
"I suppose I wouldn't have to do this much wash-up for the farmers on my route," says Vogler, "but I like to leave the place as clean as I found it. You can't handle milk without getting some of it on the floor."

At the north end of Vogler's route there is the big farm of W. R. Joslin & Son. They're just west of Sidney. They installed their Girton 300-gallon tank in 1952. "The thing I like about the tank is that the milk is measured and sold right on the farm," says W. R., "I don't know just how it happened but there was always more waste when we used the cans. It costs us 30c a hundred pounds to have the milk hauled into Dayton now, and it used to be 40c a hundred in cans. So you can see we are better off all the way around. After Vogler, the truck driver, flushes the tank out we give it a scrubbing with a cleanser-sanitizer—Thermo-San we use—then flush it out with hot water. This takes about 5 minutes. It used to take us nearly this long to do a single can. Milkstone hasn't built up in the tank since we've been using it.

"The important thing about a bulk route," says A. D. Bumstead, field supervisor for Borden's in Dayton, "is to work with your producers and be sure that there is no one being careless and producing a high bacteria count milk. I know our count used to be up around 100,000 before we had the bulk system. Now we are consistently under 24,000. We had a little trouble last winter and found that one of the producers was using a milk bucket that did not have smooth seams. It was a collecting point for bacteria and when we dumped this producer's milk in with the others on the route, it ran the bacteria count up for everyone. Of course it's easy to spot what producer has the poor milk if you take a sample from every farm every day the way we do."

Going on in closer to Dayton with Vogler we walk into the big, new milking parlor of David Mote, who is just west of Tipp City. "We always used to sell our heifers," says Mote, "but now we keep them and have gone into full-scale milk production. We were interested in the bulk tank system because it looked like a good way to cut down on the amount of labor, and labor is short here because we are in a manufacturing area. Our 400-gallon Creamery Package tank takes care of our 50 head with one man doing the milking in the parlor and a woman helping him get the cows cleaned up and ready."

On the Borden bulk milk route out of Dayton, the first one in the State of Ohio, every farmer with the exception of one uses a milking parlor with the milk going directly from the milking machine through pipes into the bulk cooling tank. The milk is harvested and handled completely by machinery on these farms. The Borden Company through their field supervisor helped get the dairymen together and plan the purchase of the tanks and advised them on the capacities needed. Then the different manufacturers of tanks were invited to send their salesmen in to talk to the farmers. On this particular bulk route there are several types of tanks represented; Mojonnier, Girton, Emil Steinhorst, and Creamery Package. The prices on the tanks which range from 200 gallons up to 400 gallons were from $2,400 to $3,000. The Borden Company did not finance the tanks nor did they try to influence the farmer on which tank to buy. It was a case of everyone taking the tank that he liked the looks of.


Milk flows from the three-unit
combine milker through
sanitary pipes to the vacuum releaser
At the the milk
vacuum pump pi
releaser up the m

The Co-op Takes Care of Everything

The exact opposite procedure has worked out to the advantage of everyone in the Maryland and Virginia Milk Producers Association at Washington where C. F. Cole, field supervisor, says, "We give our members the complete service of securing tanks and compressors as well as supervising the installation. We also calibrate and make the weight charts for each tank after installation. We have found the Mojonnier tanks to be relatively trouble free. Out of the 120 cold wall tanks that have been installed in the Washington milkshed, all but 10 were Mojonnier. The prices range from $2400 for a 200-gallon tank with a 2 H.P. compressor installed, up to $3725 for a 600-gallon tank with a 5 H.P. compressor installed. Mojonnier sends a field man in here whenever we want him and we can get operating information to the dairymen at first hand.

"We found that our members have been able to clean and sterilize the tanks so efficiently that our bacteria counts range from 2,000 to 10,000 on most pickups of

milk. We take periodic butterfat and bacteria samples once a week and the butterfat for the producer is figured on the average of five samples we take during the month.

"A few weeks ago, on an experimental basis, we placed the Ultra Violet U-Tube over the tank at the Virginia Experimental farm at Middleburg. Below are the bacteria counts of milk for November. Some days the tank was washed with washing powder and hot water and other days no powder was used. This barn has a pipeline installation which is cleaned in place.

November 3	—	1100
November 18	—	2000
November 20	—	2800
November 22	—	3200
November 24	—	2800
November 25	—	2100

"As soon as possible, we will attempt to have swabs taken from the surface of the cold wall tank before and after being subjected to the light. Our initial check on this indicated that after four minutes exposure, the sides were sterile."

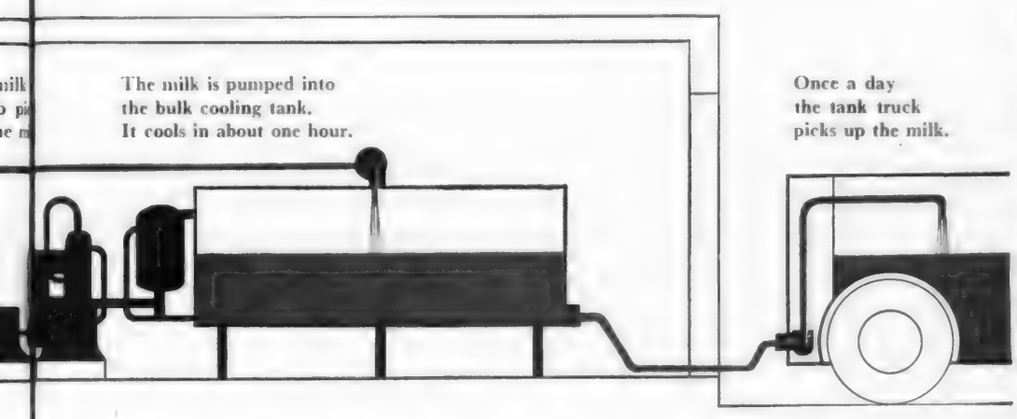
"The disadvantages to the bulk cooling system seem to boil down to one word—'price,' Most farmers have $1,200 to $1,500 in a milk cooler and cans, and in some areas where steam sterilizing equipment is required their investment may be $2,000. It's a little bit rough for these dairymen to suddenly put out $2,000 to $3,000 for another way of doing the same thing. It would be ideal to go into the bulk cooling system if you were just starting in the dairy business, but most good dairymen are old hands at it, or they wouldn't be in business today. Of course there is some salvage value in the equipment that they take out."

How Many Cows?

In some parts of the country, particularly in Wisconsin, dairymen say they can install one of the 150-gallon tanks for around $1,000 and it makes good sense even if you are milking as few as 15 cows. Up there they are required to have a Grade A milkhouse and, as many of them are converting, they have found that they can build a smaller house when they are using a bulk tank, because these tanks do provide compact storage for a lot of milk.

Then you have to have enough farmers who are willing to put out the $2,000 apiece to make it worthwhile to get into the really big money that a tank-truck costs. Of course it isn't absolutely necessary to have a tank truck. The cold wall tanks can be set on high legs and the milk drained off into cans just before shipping it to town. Some farmers have gone into this system with the idea that sooner or later someone would get a tank truck going in their area.

The bulk system of handling milk got started in California back in 1938. Milkers in the big dairies poured the milk from the milk buckets directly into a stainless steel dump tank. Then the milk was pumped over a surface cooler and dropped down into an insulated storage tank. This system was practical for the large herds of cattle in California.



MILKING PARLOR SET-UP WITH BULK COOLING TANK

The first bulk tanks in the East went into operation in Connecticut in 1948 where a stainless steel tank was used with an aerator-cooler hung down in the middle of it.

In South Carolina the stainless steel cold wall tanks were first put into operation in 1949 near Columbia.

The Good Things

The chief advantages of the bulk system to the dairyman are:

1. Increasing the milk yield by elimination of the can stickage losses. Anyone who has watched modern can dumping equipment realizes that a considerable amount of milk is lost when cans are emptied at the weight scale. This amount varies from a half pound to a pound and a half per can, depending on the can dumping procedure. The can drippings represent an economic loss to the processor. Fat sticking to the shoulders and lids of milk cans results in a high percentage of fat loss.

2. Elimination of milk losses due to ac-

(*Continued on page* 140)

RALPH WALKER of Gaithersburg, Md. takes a reading on the stainless steel dip-stick of his bulk cooling tank. By comparing this with the calibration chart made especially for his tank, he can tell within a pound or two how much milk he has to sell.

WHEN THE TANK TRUCKER arrives he measures the milk with the dip-stick, too, and takes a sample for butterfat and bacteria count analysis.

W. R. JOSLIN of Sidney, Ohio scrubs out his tank with a cleaner sanitizer after a flush-down with cold water. The tank can be cleaned in five minutes.

By A. L. Lang

ROCK PHOSPHATE

Raw rock phosphate builds up long lasting soil fertility while its teammate, superphosphate, gives fast nourishment to the current crop.

A SOIL TEST will show how much plant food the land will supply and how much we will have to add to make a crop. Manure helps dissolve the phosphorus from rock phosphate and the phosphate balances the nitrogen in manure. Bulk handling in trucks which accurately meter out the material makes for a real saving.

If you farm you have to replace the phosphorus you take from the soil. Grain crops contain the biggest part of the phosphorus they absorb—75 per cent of it—in their seed which we most often ship to market; livestock carry away in their bones some 30 per cent of the phosphorus they eat.

The constant export of phosphorus from farms in the form of cereal grains, milk, and livestock caused Charles E. Thorne, one of the pioneers in soil fertility studies, to say, "Under existing conditions the greater part of the phosphorus consumed by mankind eventually finds its way to the sea or to the cemetery, so that there is a steady flow of this element from the soil which is never returned. Wherever, therefore, the land has been under cultivation for any considerable length of time there will be a deficiency of phosphorus . . ."

Our first effort to replace phosphorus in the soil was in the form of bones. The Indians, when they planted a fish with their corn, were supplying something of a mixed fertilizer, nitrogen from the flesh and phosphorus from the bones. As early as 1653 the English were writing of using bones in agriculture and by the beginning of the last century were using all of the bones from their own slaughter houses and importing them at the rate of 30,000 tons a year. This importation of bones caused the German chemist, Justus von Liebig, to accuse the British of robbing the battlefields of Europe in order to secure fertilizer for their depleted soils.

In 1847, the British soil scientist, Sir John Laws, produced a faster acting fertilizer, the first commercial superphosphate, by treating bones with sulphuric acid. Phosphate rock soon replaced bones in this process of producing superphosphate and the industry expanded steadily with the discoveries of new phosphate deposits.

In the United States, the first mining of phosphates took place in South Carolina in 1868 and in the '80's the huge Florida deposits were opened up. In 1894 mining began in Tennessee. At present, the largest mining operations are in Florida and Tennessee, but our largest deposits are in Idaho, Utah, Montana, and Wyoming.

Efforts to use the plain rock, untreated by sulphuric acid, were made early in the game, but without success. We know now that their failure was due to the fact that the machinery was not available to crush the rock fine enough for good results. The first outstanding tests of rock phosphate for direct application were made between 1884 and 1895 by Professor W. H. Jordan of Pennsylvania State College. Professor Jordan gathered dust from the beams of the old Coosaw Phosphate Company rock crusher which was used to crush South Carolina phosphate for shipment to England. Because the dust of the mill had floated up in the atmosphere and settled on the beams, Professor Jordan referred to this extremely fine-ground rock as floats. Rock phosphate carried this name for many years and many of the experimental trials here and in foreign countries refer to it as floats.

THESE JETS OF WATER strike the newly mined rock phosphate to wash away the impurities. After this vigorous cleaning, the rock will be crushed to a powder fine enough to pass through a 200 mesh screen.

Rock Phosphate and Superphosphate

In order to be of any value to the living, growing plant, the plant foods in the soil must be soluble in water and in the plant juices. No matter how finely the nutrients are ground, no plant can take them in as solids. Rock phosphate is no exception and, in its natural state, it is not water soluble. So, before the plant can make use of this essential food, the acids of the soil or acids secreted by the plant itself must work on the tri-calcium-phosphate of the rock and change it to a water soluble mono-calcium or di-calcium phosphate. In this state the plant can absorb the phosphate. This is the same kind of phosphate as is present in super phosphate. The fine grinding which makes rock phosphate usable as a fertilizer (it should be ground fine enough to pass through a 200 mesh screen) is valuable because it multiplies many thousands of times the area of the rock which is exposed to the soil and plant acids.

Superphosphate is made by the rather simple process of mixing rock phosphate with sulphuric acid. Roughly a ton of rock phosphate mixed with a ton of sulphuric acid produces two tons of superphosphate. A ton of this mixture will have half of the phosphorus of the original ton of rock phosphate, but it will be in a form which is more immediately available to plants.

Another source of phosphorus for the soil is the slag from blast furnaces. In Europe this is one of the most important sources of phosphorus, but in America only the iron ore in the Birmingham, Alabama, area contains enough phosphorus to make the slag worth using. The Birmingham slag contains from 8 to 10 per cent phosphorus and also supplies the soil with valuable calcium and magnesium.

One of the first advocates of the use of the raw rock phosphate was the late Cyril G. Hopkins of the University of Illinois. His influence in this matter was so great that today Illinois uses 600,000 tons of rock phosphate each year and Missouri uses another 200,000 tons. Together, these two states use more rock phosphate each year than all the rest of the world.

The theory behind the use of rock phosphate in Illinois is to apply it in great enough quantity so that an ample amount of phosphorus is available to the plant in all parts of the soil over a period of years. Figures show that this heavy application of rock phosphate is not made at the expense of other plant food materials. In both Illinois and Missouri, farmers are using more additional fertilizers, including superphosphate, than has ever been used before. Illinois farmers are using over ten times as much additional fertilizer as they used in 1940. The problem is to use each form of fertilizer where it is the most economical and will do the most good.

Test Is Best

Until recently the amount of fertilizer put on the land was a matter of guess or trial and error. But here is one time when ignorance is not bliss—not when too much fertilizer is a waste of money and too little won't produce a crop. Fortunately we have several ways to determine the requirements of the plants. With phosphorus we study the cropping plan, watch for plant deficiency symptoms, keep track of the previous soil treatment history, as well as making quick soil tests and plant tissue tests. Even without these tests it is safe to guess that most of the soils in the humid areas of the country which haven't been treated with phosphates are low to very low in available phosphorus. In the southern two-thirds of this area the soils will be very low in total phosphorus. In the semi-arid and dry regions of the country the phosphorus supplies are usually still adequate, but irrigation and improved production will soon use up this pleasant bank balance.

THE GRAIN contains most of the phosphorus the crop takes from the soil. We don't want to stop this withdrawal, but we must replace the stolen fertility.

In studying the cropping plan it is well to know how much phosphorus the plants withdraw from the soil. Here is the phosphorus content of some common farm products:

Phosphoric Acid (P_2O_5) Content of Farm Products

Crop	Pounds of P_2O_5 per 1000 pounds of crop
Corn grain	6.2
stover	2.7
Cotton seed	12.5
Wheat grain	9.4
straw	2.0
Red clover hay	5.7
Timothy hay	3.4
Alfalfa hay	5.5
Bluegrass	5.5
Lespedeza hay	8.0
Soybeans seed	15.8
straw	4.3
Potatoes tuber	1.5
Tomatoes whole	0.7
Tobacco whole	6.5
Sugar beets tuber	1.0
Cattle, beef	18.4
Hogs, fat	6.9

We can replace this phosphorus by spreading our fields with cattle manure which contains 2.8 pounds per thousand, rock phosphate which contains 320 pounds, and superphosphate which contains 200 in a half ton.

Solving the phosphorus problem on the farm is a matter of simple mathematics. Determine what the soil can supply, figure how much the crop or crops require, then make up the difference. There is a catch, however, in figuring the amount of phosphorus the fertilizer will supply. Applied phosphates are not one hundred per cent efficient. Their efficiency varies with the soil, crop, season, method of application and carrier. When applied broadcast on phosphorus deficient soils, superphosphate has usually had an efficiency factor of between 15 and 20 per cent for the first crop. Rock phosphate, when applied at relatively high but normally recommended rates of from 1000 to 1500 pounds per acre, will have from 5 to 10 per cent efficiency on the first crop when used on humid, acid soils and crops adapted to its use.

Michael Garaiot has used tests and a cropping plan to find the phosphate needs of his central Illinois farm. On the 150 tillable acres of his farm he has a five year rotation of corn-corn-beans-wheat-hay: that is 60 acres of corn which produces an average of 75 bushels to the acre and uses 46 pounds of phosphorus, 30 acres of beans producing 30 bushel to the acre and also consuming 46 pounds of phosphorus, 30 acres of wheat producing 30 bushels to the acre and using 18 pounds of phosphorus, and 30 acres of hay which produces at the rate of 3 tons to the acre at a cost of 35 pounds of phosphorus. When he totaled it up, Garaiot figured that he needed some 5730 pounds of phosphorus each year to produce his crops. Soil tests showed that his land was very low in phosphorus and was able to supply half this amount.

If he used the phosphorus from the soil and supplied but half in the form of fertilizer, he would be depleting his soil each year and each year he would have to supply a larger amount. So, because his soil was already badly depleted, he decided to supply all of the phosphorus needs as well as additional amounts to build up the soil. With a little work with his stub pencil he figured that it would take slightly over nine and a half tons of rock phosphate, 9.56 to be exact, with a phosphorus content of 30 per cent to supply the annual need. In order to take advantage of the savings in bulk application he put on enough for ten years, spreading it on the land just before the small grains and clover. In addition to this he applied 200 pounds of superphosphate to the wheat and 150 pounds to the corn which acted as a stimulant and supplied the needs of the higher yields.

Once on an even keel as far as replacing the year to year phosphorus drain on his soil, Garaiot turned to the problem of building up the balance of phosphorus in the soil to get it out of the very low class. He decided that the economical way to do this was to hit the land again with an equal application at the beginning of the new rotation which would give him another ten years' supply over and above the five years' residue from the first application.

Though the requirements of the crop have been figured in advance a farmer will want to keep an eye out for signs of phosphorus deficiency. In many strains of corn the deficiency will show up as a coloring of the leaves to a reddish purple, in other strains the leaves will yellow in much the same way they would if they were starving for nitrogen. In clovers, the plants needing phosphorus will be spindly and will have a dark bluish-green foliage: the roots will form very few nodules and the nitrogen fixation will be reduced. If there is any doubt as to the deficiency a test of the plant tissues such as the one made with the Colorstrip Plant Testkit developed by Dr. Roger Bray will show in a minute whether or not it is getting a proper amount of phosphorus.

The Phosphate Team

Rock phosphate and superphosphate should be thought of not as competitors but as a team to supply the needed phosphorus for our crops. In general, rock phosphate is used in large quantities on somewhat acid soil to produce a usable plant food at a rather slow rate over a long period of time. Applied in heavy doses, rock phosphate enriches the entire

upper layer of the soil. Converting the rock phosphate into a soluble plant nutrient is speeded up by decaying organic material. This makes rock phosphates and manure an excellent combination, the manure speeds the conversion of rock phosphate into soluble plant food and the rock phosphate tends to preserve the nitrogen in manure for plant use.

Superphosphate can be used with good effect on much more alkaline soils than rock phosphate and will supply the phosphorus needs of some plants which do not feed well on the rock phosphate. Quite often the two forms of fertilizer are used together, the rock phosphate to build up the general fertility of the soil and the superphosphate placed with the seed to give the young plant plenty of available phosphorus early in life.

Crops vary widely in their requirements for phosphorus and in their ability to feed on the phosphates in the soil. Legumes, buckwheat, rye, timothy, cabbage, carrots, and rape are a few crops which are known to be good feeders on the phosphorus of rock phosphate. Wheat, tomatoes, potatoes, and various southern grasses seem unable to take their required amount of phosphorus from rock phosphate except on very acid soils. These latter plants need superphosphate in their fertilizer.

In Illinois with its rather wide variation of soils, rock phosphate has been recommended for a great many years in what is called the Illinois System of Permanent Soil Fertility. The fundamental objective of this system, which sounds a little like the Boy Scout oath, is making and keeping the soil physically fit, chemically balanced and biologically active. This requires soil tests to find out where you are and a plan to decide where you are going and when you will get there.

When the phosphate needs are determined through tests, the greater part of this plant food is furnished in the form of rock phosphate. Superphosphate is used as a starting and stimulating fertilizer. The raw rock phosphate is spread over the fields in bulk applications of from 1000 to 1500 pounds to the acre and plowed down for the legume crop. The legumes, being good feeders on rock phosphate are able to take up all of their needed phosphorus and leave a balance of soluble plant food for the crop which follows. The presence of adequate supplies of phosphorus stimulate the legume in its formation of nitrogen filled nodules. We have found on one field in Illinois that the corn yield was increased 18 bushels to the acre by the application of 1600 pounds of rock phosphate which had been applied the previous year to soybeans and consistently greater yields were made on this field for the following four years without further applications.

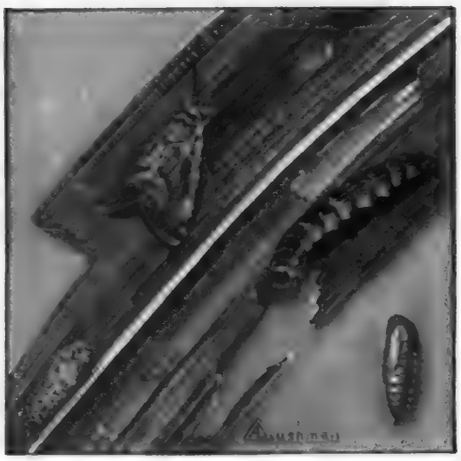
In Bourbon County, Kentucky, Dr. Eslie Asbury has taken a worn-out, eroded hill farm and built it into one of the outstanding livestock farms in the district with the use of lime, mixed fertilizers, and rock phosphate. The mixed fertilizers have been used mainly on the ten-acre tobacco patch and the lime and rock phosphate have gone onto the pastures.

"When we started," Dr. Asbury said recently, "the place had been plowed to the point where I hated to work the soil again. I didn't. I put on heavy applications of rock phosphate. We've used

(*Continued on page* 110)

ROCK PHOSPHATE, like limestone and rock potash, can be handled in bulk, making use of heavy equipment for handling and spreading with plenty of horsepower but very little manpower.

When young plants are found cut off at ground level during the spring and early summer Cutworms are usually the culprits. They are the larvae of a night-flying moth. After fattening they change in the soil to the brown pupa shown at the left.



Armyworms are a variety of cutworms. They derive their name from the manner in which they mass together and march from field to field in their search for food. They cause serious damage in corn, grasses, legumes and some small grains.

Hidden in its ball of froth the Meadow Spittlebug is effectively protected from its natural enemies while it sucks away at the sap of its alfalfa host plant. These pests have inflicted heavy damage on Midwest hay crops in recent years.

Kill that bug...

Long before flying saucers and space ships, farmers found themselves embattled against celestial invaders. These invaders were not imaginary; they were uninvited bugs. They came for dinner and they stayed for supper, then they decided to spend the rest of the season. Of course not all insects are the natural enemies of man —far from it. For many, like the ladybug and the Lydella fly are man's allies in the fight against the miniature enemy armies. And the bee is one of man's most valuable domesticated servants. When bad bugs increase beyond all bounds, the farmer is forced into a battle of survival.

One of the cardinal rules of warfare is never to under-estimate your adversary.

This fellow needs no identification. The grasshopper is seen everywhere and is known by all. Though tradition makes him the playboy of the insect world he can inflict a lot of damage on a meadow before his time is up. Insecticides stop him cold.

Down in the Southwest where he makes himself notorious the largest of this trio is called the "Conchuela" or little shell. He still smells the same as his cousins though, and all three are commonly known as Stink Bugs. Alfalfa is a favorite morsel with them.

The Clover Seed Chalcid is strictly a seed eater. He won't touch your hay crop, but if you're going in for seed production you'll find him a formidable opponent, particularly in the South and West.

King cotton is not alone in his troubles with the weevil. The Sweet Clover Weevils moved into this country from Canada some years back and have found our Midwest stands of sweet clover much to their liking. They are particularly hard on young stands.

Until potato growers learned how to control this fellow he kept their yields at a low level. The Potato Leafhopper is just as fond of alfalfa as he is of potato plants and is always a serious threat to good hay crops.

The Webworm wraps himself inside a web as he feasts on alfalfa. Eventually the larva spins a cocoon from which he emerges as a moth. He overwinters either as a caterpillar or pupa in the cocoon shown in the inset.

That means you have to know something about your enemy. While no individual could ever hope to know the more than 82,000 species of insects that have been identified in North America, it is essential that he have at least a nodding acquaintance with a few of those that currently lay siege to his fields.

This subject of insects being so extensive, we'll leave the orchardists with their enemies the spider mites and the fruit flies, the truck raisers with their hornworms and beetles, even the corn raisers with their borers, and we'll limit ourselves for the time being to a look at only those pests that cause trouble in forage crops. This will still leave us with a sizable swarm of bugs for consideration.

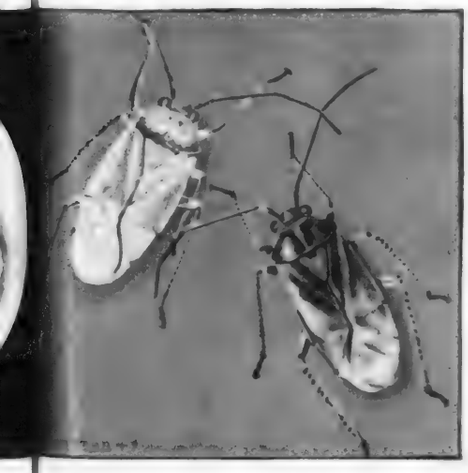
Until recently these crops had received but little attention when it came to pest control. That pale green alfalfa and the clover with its aroma for filling June days hadn't been bothered too much by insects. Old-time pastures, with their relatively low per-acre value, didn't warrant the use of expensive insecticides and application equipment. The attacks of new types of pests, however, such as the spittlebug invasions in the Midwest in the last half dozen years, together with the trend to grass farming with its super hayfields and the increase in hay prices, have called for a declaration of war on the flashy characters that illustrate these pages.

Spittlebug

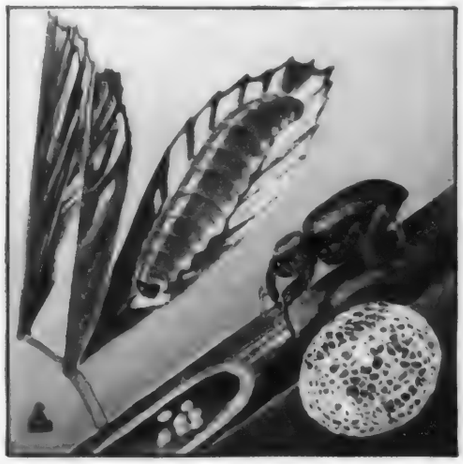
Since the spittlebug has already been mentioned, let's lead off with him. Years ago, back in those days when you used to scamper barefooted across the meadows on your way to the creek on one of those beautiful May mornings that made fishing more important than arithmetic, you may have noticed a little ball of froth here and there on the alfalfa or clover. But it "didn't 'mount to nuthin," and never caused any serious setback in the hay crop.

Of the last few years, though, those froth balls have become all too common in the Midwest and the young spittlebugs feeding within them, sucking ravenously away at the sap of the plant, have caused

Juvenile delinquency is typical in even the best of insect families and the Lygus Bugs are no exception. The nymphs are much more destructive than the adults. Since there are six or more generations a year there are always plenty of nymphs around.



The Alfalfa Weevil is the number one criminal so far as alfalfa destruction is concerned. Here are shown the adult, the eggs deposited within the stem of the plant, the larva feeding on the leaves and the netlike cocoon from which the adult emerges.



The wooly Salt Marsh Caterpillar is distributed throughout the United States. Though not an economic pest in some areas, in others the little brown worm does a thorough job of devastation on just about every garden and field crop.

Color illustrations courtesy of Hercules Powder Company, producers of technical Toxaphene.

DILUTION TABLE FOR INSECTICIDES

Insecticide Formulation	Amount of Formulation Needed Per Acre to Obtain the Following Amounts of Actual Chemical Per Acre.								
	1/8 lb.	1/4 lb.	1/2 lb.	3/4 lb.	1 lb.	1-1/2 lbs.	2 lbs.	2-1/2 lbs.	3 lbs.
10% - 12% Emulsion Concentrate (contains one lb. chemical per gal.)	1 pt.	1 qt.	2 qt.	3 qt.	1 gal.	1-1/2 gals.	2 gals.	2-1/2 gals.	3 gals.
15% - 20% Emulsion Concentrate (contains 1½ gals. chemical per gal.)	1/3 qt.	2/3 qt.	1-1/3 qts.	2 qts.	2-2/3 qts.	1 gal.	1-1/3 gals.	1-2/3 gals.	2 gals.
25% Emulsion Concentrate (Contains 2 lbs. chemical per gal.)	1/2 pt.	1 pt.	1 qt.	3 pts.	2 qts.	3 qts.	1 gal.	5 qts.	1-1/2 gals.
40% - 50% Emulsion Concentrate (contains 4 lbs. chemical per gal.)	1/4 pt.	1/2 pt.	1 pt.	1-1/2 pts.	1 qt.	3 pts.	2 qts.	5 pts.	3 qts.
60% - 65% Emulsion Concentrate (contains 6 lbs. chemical per gal.)	1/6 pt.	1/3 pt.	2/3 pt.	1 pt.	1-1/3 pts.	1 qt.	2-2/3 pts.	3-1/3 pts.	2 qts.
70% - 75% Emulsion Concentrate (contains 8 lbs. chemical per gal.)	1/8 pt.	1/4 pt.	1/2 pt.	3/4 pt.	1 pt.	1-1/2 pts.	1 qt.	2-1/2 pts.	3 pts.
25% Wettable Powder	1/2 lb.	1 lb.	2 lbs.	3 lbs.	4 lbs.	6 lbs.	8 lbs.	10 lbs.	12 lbs.
40% Wettable Powder	5 oz.	10 oz.	1-1/4 lbs.	1-7/8 lbs.	2-1/2 lbs.	3-3/4 lbs.	5 lbs.	6-1/4 lbs.	7-1/2 lbs.
50% Wettable Powder	1/4 lb.	1/2 lb.	1 lb.	1-1/2 lbs.	2 lbs.	3 lbs.	4 lbs.	5 lbs.	6 lbs.
75% Wettable Powder	1/6 lb.	1/3 lb.	2/3 lb.	1 lb.	1-1/3 lbs.	2 lbs.	2-2/3 lbs.	3-1/3 lbs.	4 lbs.
1% Dust	12-1/2 lbs.	25 lbs.	50 lbs.	75 lbs.	100 lbs.	150 lbs.	200 lbs.	250 lbs.	300 lbs.
5% Dust	2-1/2 lbs.	5 lbs.	10 lbs.	15 lbs.	20 lbs.	30 lbs.	40 lbs.	50 lbs.	60 lbs.
10% Dust	1-1/4 lbs.	2-1/2 lbs.	5 lbs.	7-1/2 lbs.	10 lbs.	15 lbs.	20 lbs.	25 lbs.	30 lbs.

In applying insecticides it is of great importance that the correct amount of the actual chemical be used. This table was prepared by the Department of Entomology of Purdue University.

losses in the hay crop running as high as 90 per cent. Somewhere along the line, the natural balance that formerly restrained the spittlebugs has been thrown out of whack.

The little bugs within the mass of spittle are the nymphs that have climbed up the plants after hatching from eggs that were laid the autumn before on the straw and stubble of the field by the winged froghoppers. The spittle they secrete is a by-product from the life-blood of the plants and makes a very effective protection against the wind and sun that would otherwise dry them out. They seriously damage the first cuttings of hay by stunting the growth of the crop.

By the time the mowers hit the hay fields, most of the nymphs have earned their wings and dart ahead of the cutterbar in legions. They stay around for the rest of the summer, grazing your choicest fields, like a herd of miniature steers. They lay their eggs in late August and September, then move on to greener pastures.

In areas where the drought was severe last year the spittlebugs were apparently laid low and may not be too much of a problem this season, but the question still is, how to get rid of them in a big way? While the problem of insect control has its long-range aspect, in that it may be possible to establish control through natural balance brought about by better plant nutrition and the aid of the pests' natural enemies, the farmer whose crop is being ruined must have immediate action and that calls for an insecticide.

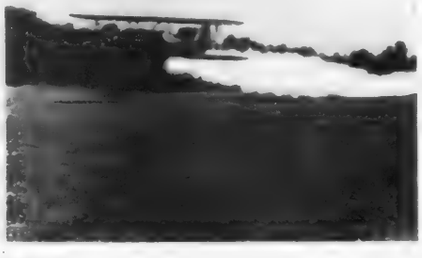
The experts point out that an insecticide for use on forages must be straight-laced when it comes to certain qualifications. These points are:

1. It should provide sufficient control of a variety of pests at low concentrations.
2. It should be safe to handle and apply.
3. It should not leave a toxic residue on hay.
4. It should not take the pasture out of use for more than a short period after application.
5. It should not cause off-flavor in crops that might follow forage in the rotation.
6. It should neither be secreted in milk nor stored in tissue.

These six points are a big order to fill. Tested by these standards two of the best weapons for spittlebug control this year will be methoxychlor, benzene hexachloride, more easily referred to as BHC, and toxaphene. Everybody, by this time, is acquainted with DDT, the insecticide sensation of World War II. Not all insects, however, are affected by DDT and because of its extreme toxicity to bees and its long residual action it is not the best material for use on meadows and pastures.

Methoxychlor is an analog—a changed chemical construction—of DDT. It may be used with safety around bees, is only 1 24 as toxic to warm-blooded animals as DDT and though its residual effects are not nearly as lasting as DDT, it is still recommended that no field on which it has been used be pastured within seven to ten days. Methoxychlor is relatively expensive. Enough material to treat an acre currently costs around $2 to $2.50, which

Operation Insect! For quick and efficient dusting or spraying it's hard to beat airplane application.



is twice as much as some of its competitors.

BHC does a spectacular job of spittlebug control. The day after an application a farmer can walk through his meadow sweeping the dead nymphs before him by the tens of thousands. BHC is toxic to bees, but since the little frothmakers must be attacked long before bloom stage, this is not a disqualifying hazard.

As it is only the gamma isomer—that is, what might be called "part C" of the compound—of BHC that is toxic to insects and as the other isomers have a very disagreeable odor, our chemist friends have found a way to isolate the gamma isomer and have come up with the name Lindane for this BHC derivative. As might be expected, Lindane is equally as effective as BHC against spittlebugs, but will be found to be more than twice as expensive to use. One of the commercial BHC preparations will do a good job of stopping spittlebugs at a current cost for the insecticide of about 90 cents an acre when applied as a spray. The same manufacturer's Lindane would cost between $2.30 and $3.25 an acre depending upon whether an emulsifiable concentrate or a wettable powder were used.

Toxaphene is still another potent weapon against the spittlebug. It is one of the least injurious to bees of all the organic insecticides, but it has a relatively long residual hazard and is about four times as toxic to warm-blooded animals as is DDT. Its use, however, on legume hay presents no hazard if applied at the proper time while the plants are small.

In what forms and concentration these poisons should be used is a point that should be taken up with your local extension people and insecticide dealers. Some states, for instance, recommend only one or two of the four products mentioned above in their publication on spittlebug control; practically all have their own ideas about concentration and rates per acre. And while most of them are cautious in warning that fields should not be pastured for a period after application, Indiana says that fields sprayed with methoxychlor "can be pastured at once since residues will not collect in the milk or fatty tissues." Recent Utah tests seem to confirm this statement.

The one sure-fire and indisputable recommendation for beating the spittlebug is to go into action early. Watch your meadows and pastures closely all during April and early May and at the first sign of infestation, let 'em have it.

Fall spraying the first week in September with one and a half pounds of actual DDT per acre to kill the adult spittlebugs before they lay their eggs has recently been found to be a very effective weapon in several States.

Methods of Application

This brings up the point of application. Spraying and dusting are the usual means of applying insecticides. Aerosols, which are a fine dispersion of the insecticide material in a gas, are widely used in greenhouses but are not adapted for use in general farm work. Dusting may at times be more advantageous than spraying since

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. . . Nine . . . Ten . . . and out! This marauding knight of the hay fields—Sir Gaston Grasshopper—has just lost a joust with toxaphene.

By Al Haller

HOW TO BUY A BOAR

You don't have to be a Bengal Lancer ready to risk life and limb in order to take part in America's annual boar hunt—all you need is the belief that you can pick a good boar when you see one and a willingness to risk some hard cash on your choice. But many a farmer has found that boar hunting can be a dangerous game in America. You rarely get ripped by a tusk, but it's possible to be put out of the hog business by errors made in the boar hunt.

The boar is a pretty important character around a swine herd for more reasons than one. From the standpoint of settling all the sows with pig so that the farmer can stay in the swine business, he is the big wheel. This is his first and main reason for existing. The slow or non-breeding boar can be very expensive if he causes the farmer to miss a crop of pigs or get his pigs to market a month or two late. Not only is feed wasted keeping nonpregnant sows around, but there is a considerable loss when late pigs are ready for market after the price has dropped.

Let's not expect too much of the boar, however. The new boar has absolutely no effect on litter size—that is the sow's department. If she ovulates five ova during a particular heat period, five pigs are all that she can have no matter how potent the boar is. In any one mating he will inseminate the sow with millions of sperm; so, if the sperm are alive, the number of eggs the sow produces will determine the size of the litter.

The boar's effect on litter size comes when his daughters are bred. Half of their inheritance comes from him and litter size is one of the characteristics he will pass on to them. This is the second reason why the herd boar is such an important fellow. Not only does he settle the sows so that there can be pigs, but

all of the offspring carry one-half of their inheritance from him. The other half comes from each one's own particular dam. This makes the boar's impact on the herd much greater than that of any particular sow. Selecting the herd boar, therefore, is half the battle. It's a happy day if the farmer happens to select a good boar and his crop of pigs all carry 50 per cent of the favorable characteristics. The man who picked a boar with bad inheritance, on the other hand, is a pretty sad sack when he realizes that the boar is down-grading the pigs with his half of their inheritance.

What should the boar hunter be looking for when he straps on his check book and begins his test of skill? I would list them as follows: First, his inheritance for production. Second, his general appearance—which, in my book is a bit broader than "type." Third, and to me the most important, his health.

Check the PR Record

One type of boar hunter is Pedigree Pete. He is the guy with the gleaming eyes and glittering check stubs who has just paid a fancy price for a pedigreed boar. Some of these hunters may have a hard time reading the pedigree they've bought or explaining its significance. I've known a few who weren't even sure which was the sire side and which the dam side, but one and all believe that a pedigree makes an ordinary boar into a superboar. A pedigree is, was, and always will be a chart representing a line of ancestors. It becomes valuable to us only when we know what these ancestors are transmitting to the boar in question. The worst possible looking runt can have a pedigree just as does the Grand Champion at the International.

Pedigree Pete will usually mention that the great-great grandfather of his boar was Old Super Snort, reserve champion of the State Fair. According to the laws of heredity, his great-great grandfather has about as much effect on the boar's ability to transmit desirable qualities as I have in raising the level of Lake Superior by pouring in a bucket of water. Mendel, working with his bean plants, showed how the laws of heredity work and, whether it is pork or beans, the laws haven't been repealed. The parents of an individual each contribute 50 per cent to the heritable traits, characteristics, instincts, and general make-up of their offspring. Grandparents, which include four individuals, each contribute 25 per cent. Great-grandparents, eight individuals, contribute 12½ per cent each. Great-great-grandparents, 16 in number, each contribute 6¼ per cent to the individual.

If Old Super Snort contributed just 6¼ per cent to the individual, then the other 15 ancestors in that generation contributed 93¾ per cent. In addition to this, some of the desirable characteristics are slightly heritable. Litter size is one of these traits which is tied up with many other factors and can not be considered 100 per cent heritable—geneticists figure it is about 9 per cent heritable. For this reason we want to be sure that both sides of the family tree are strong on this important, hard to transmit characteristic. If the pedigree is not loaded with production record figures and if the buyer has not actually seen the sire and dam, the farmer might just as well use the pedigree for wrapping paper.

The production registry programs which have been sponsored by the swine breed associations and by the colleges are designed to promote record keeping as to litter size and rate of growth. In this way we are able to locate and breed from our heavy producing families. A Production Registry card is made out for each litter showing the number of pigs born and their registry numbers, their birth weight, sex, weaning weight, weight at five months, and a listing of abnormalities, if any, which would make them unacceptable for registry.

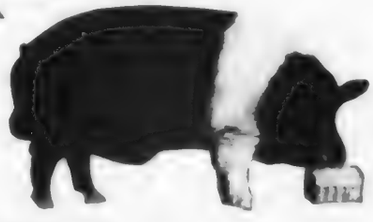
In checking the records, be sure that the sow's litter size is recorded as well as number of pigs raised. As simple as this may sound, it bears investigation because many so-called PR records merely list the number of pigs born. I once saw a record which showed an unusually large number of pigs born. After practically twisting the breeder's arm, I found that it meant all those born—whether dead or alive.

Another item on the PR record which requires a second look is the weight of the litter. The buyer should require more than the weaning weight because this weight may only be a reflection of the sow's milking ability. We want to know about this, but we also want to have some idea as to the rate of gain of the pigs and the economy of feed production. The 156 day weight figure should be recorded and should carry the most weight with the buyer.

The production records of both dam and sire are important in evaluating the boar's ancestry. His dam's evidence of produc-

(*Continued on page* 104)

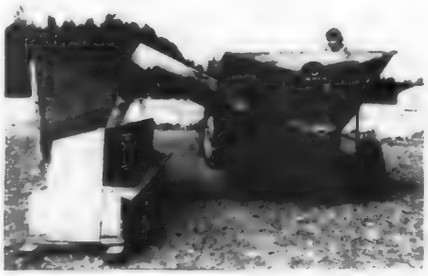
TYPEY, HEALTHY, and with outstanding PR records, these handsome boars are real herd builders.



SIZE OF LITTERS produced by the boar's dam and by daughters of his sire, show one important characteristic which he can be expected to pass on to his daughters.

CHOLERA SHOTS should be given at least four weeks before the boar is moved to his new home.

TURKEYS



THIS TWO-TON feed wagon, which unloads automatically with a worm-type elevator, cuts short the work of feeding 20,000 birds on range. Oldenburg makes the rounds every five or six days dishing out pelleted mash and grain for the older turkeys.

Washington's leading turkey producer started at the top. Last year he marketed 57,000 of the new Beltsville Whites.

By R. J. McGinnis

Herman Oldenburg's turkey farm is located in one of those fabulous Washington valleys where everything grows twice as large and twice as fast. Roses measure 6 inches across, one strawberry plant bears a quart of fruit, Royal Ann cherries grow in every farmyard, and a man can start in the turkey business one year and market 57,000 birds the next. That's what Herman Oldenburg has done.

"Sometimes I go out after supper when Mt. Baker looks like a dish of strawberry ice cream in the sunset," Herman says, "and yell across the field to my turkeys, 'How you doing, friends!' A couple hundred Whites stick out their necks and gobble back at me. In five minutes twenty thousand are doing it. Folks five miles away in Lynden can hear them."

"He's only been in business two years," Gerry Gannon, who heads the Bellingham Chamber of Commerce and promotes Whatcom County on the side, said last autumn. "Started with no turkeys at all and he'll market 57,000 Beltsville Whites this year. That's more than anyone else in the whole state of Washington."

Gerry took us out to Herman's farm on the Pole Road near the little Dutch town of Lynden. Between the road and the house there were thirty acres of what looked like solid turkeys—20,000 birds, we found out later—and enough loose feathers to stuff a carload of featherbeds. Turkeys were bunched around the feed bins, pecking enthusiastically at the mash. The toms were sauntering about, spreading their plumage, doing a little half-hearted courting, and calling each other names.

We found Herman sitting on the edge of a wagon watching feed run out of a bin over his head. Climbing down to shake hands, he turned out to be a tall, gangling man wearing steel-rimmed spectacles which kept slipping down on the end of his nose. He had a shy sort of smile, but plenty of assurance. When turkeys were mentioned he loosened up like a politician at a picnic.

He started in the turkey business two years ago this March, he said, though he doesn't know exactly why he decided to raise turkeys. "Cliff, my brother who manages the Western Cooperative Hatcheries at Bellevue, Washington, talked turkeys to me all one winter. After a four-year stretch in the Navy and several years in business in Seattle, I wanted to get out of the city and those Whites looked good."

Turkey Without Hash

The Beltsville White turkey, Herman explains, was developed at the USDA station at Beltsville, Maryland, about 10 years ago. It is a small bird when marketed at 16 weeks, dresses out from 6 to 10 pounds, and is designed for small families. If allowed to fully mature, the Beltsville White weighs 9 to 15 pounds dressed.

"People can have turkey the year 'round now," he says, "and they don't have a week of cold slices, hash and soup like they had when they got a 15 or 20-pound Bronze. A Beltsville White is good fried or broiled, too," he adds.

"Six years ago there wasn't a Beltsville turkey in the state of Washington. That year Cliff went East and brought home 500 eggs. About three years later there were enough White poults for a good start, so I decided I'd try them."

Near Bellingham, in Whatcom County, he found a 120-acre farm, on which he took a five-year lease. There was a big barn on the place and some old poultry houses; his only expense would be brooders, feeders, and a little fencing. He built the feeders and put up the fence himself, got credit at the local bank for feed and poults, and in March, 1951, put in his first batch of 3,300. By December he had marketed 33,000 birds. Last year, 1952, he marketed 57,000. This whizzed him ahead as the biggest turkey producer in the state.

"There are two or three operators in Washington who raise Bronzes and they may market more pounds than I do, but I market more birds," he says.

Herman showed a gambling streak when he decided to start in turkeys at the top instead of at the bottom. "I figured I could learn more from a big bunch than I could from a few," he says. "If I had the knack I'd make myself some money right away—I had to—and if I went broke, I was going stoney broke."

He makes turning out 57,000 turkeys a year look deceptively easy. He fenced 30 acres of his farm into 9 ranges, using 6-foot woven wire sunk deep into a 6-inch furrow to keep out dogs and foxes. Then he built three or four feeders and small

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LAMB POOL

By Charles R. Koch

THE TAIL GATE went up and the lambs cascaded down the unloading chute. One lone lamb bleated in fear and turned toward the cab, but the truck driver prodded it into line with a long pole through the sides of the rack. A dozen trucks followed, each letting out a stream of lambs that leaped and slid down the ramp into a large pen.

It was seven-thirty and a fairly chilly and decidedly misty September morning. For some time now the trucks and an occasional two-wheeled trailer had been unloading their lambs at the pens behind the Co-op feed mill. The farmers were gathered around the central pen where two men were operating. Each lamb was caught and quickly felt on its rump and ribs by the man doing the grading, whose conversation ran: "Single blue, Joe. Single blue." And again, "Double blue," or less often simply, "Red."

As each lamb was graded, the second man grabbed a short iron rod looped at the lower end like a branding iron from one of three cans of paint hanging on the side of the pen. With this he marked each individual as instructed.

When all the lambs in a consignment had been graded and marked, the lot of them was shunted across the scales according to the color of their spots and then held in separate pens with others of their particular grade.

The grading was done with the quiet, efficient, unhurried manner of good stockmen. Occasionally it was interrupted by farmers who climbed into the pen to question a marking. The interruption was always welcomed by the grader who took time out and capitalized on the opportunity to explain his decision.

By nine o'clock most of the drivers had shed their leather jackets, the last lamb had been weighed and reloaded ready for the trip to the terminal market and in another 15 minutes the feed mill yard was deserted.

In that time a lamb pool finished its twice monthly operation and some 20 farmers were in a position to sell their lambs at $1.50 to $2 more per head than would have been the case on the open market. Though the lambs were retrucked to a terminal market, at many of the larger country stockyards packers' representatives are on hand to bid for the offerings as soon as the grading has been completed.

Lamb pools are an institution unique to Eastern lamb centers that could profitably be copied in other areas. The pool is a system by which quality lambs are sold on their merit rather than on a run of mine bunching. On regularly scheduled days, farmers ship their marketable lambs to central locations where reliable and experienced marketmen or extension specialists grade them on the basis of condition, conformation, finish, quality and weight and mark them with various colors to designate their grades. These colors do not necessarily correspond to slaughter grades. It is up to the buyer to decide in his own mind whether the double blues from a particular pool are prime or choice. After each consignment is weighed by grade breakdown, the lambs lose their identity and are penned with others of the same color-grade. They are then sold by grade to the packers' representatives.

That's all there is to it. But behind the pools are some mighty solid breeding, management and feeding plans without which only a minor percentage of the lambs would ever make top grades.

How It Started

It all started back about 20 years ago when some central Ohio farmers decided that they weren't getting all they should for their lambs, particularly their better ones. The market men and extension workers were inclined to agree with them. Packers seized this opportunity to point out, though, that the quality of the lambs then being offered at the yards was far from meeting the standards set up by the packing house buyers who, as always, were trying to key their purchases to the public taste for tender, juicy chops and roasts. The packers were sorely in need of broad-

Doing it the hard way, lamb grader Art Beasley tries a choice spring lamb for size . . .

An assistant pulls the blue marker from the paint pot, daubs the lamb with the mark of distinction . . .

Sound management on the farm, careful grading at the market means more dollars for lamb raisers

backed, parasite free lambs that would tip the scale consistently around the 85 to 90-pound mark. But less than half the lambs from some of the best producing counties in the state were able to meet their standard.

It happened that there were just the men around at that time who were good at stirring things up and getting them started. Fellows like Walter Bluck, then extension agent of Ohio's Clinton County, and C. W. Hammans, Marketing Specialist from Ohio State University, threw their talents behind the know-how of people working in the regular markets, men like R. Q. Smith and Russ Kimber, manager and fieldman respectively, for the Livestock Producers Association at Cincinnati. Farmers were cooperative but little organized. So county sheep improvement committees rose to the occasion, led by commercial sheep-raisers and purebred breeders, among them Leonard Yochum, Heber Custis, Hamer King, Willard Bitzer and several score of others who had the urge to make the sheep business a first string enterprise in the Mid-West.

Bitzer, the weather-beaten, soft-spoken, veteran Dorset breeder and commercial feeder was reminiscing one day late last summer while some 600 head of really top lambs were arriving at the Fayette County Stock Yards for grading and sale. "There never was any doubt in our minds right from the start as to what we were shooting at," he said. "We all wanted a better return from our lamb crop. But we also knew that demanded more than unloading a lot of lambs and asking for a higher price.

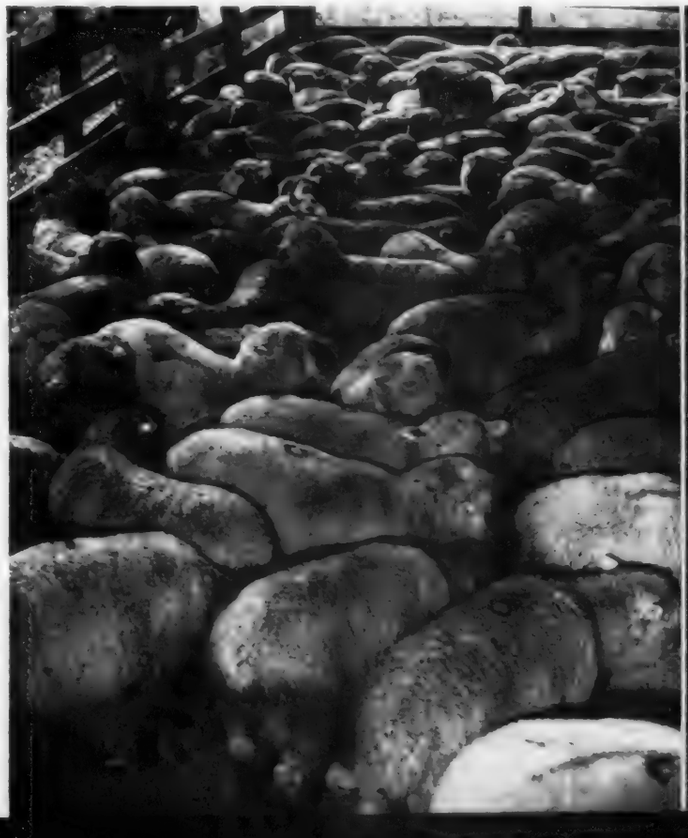
"The common way of selling lambs was for the farmer to ship as many of them as he thought ready for market to the yards where they were sold as a lot with little or no grading. If any sorting at all was done, it was merely a matter of pulling out the culls and averaging the price for the balance so that the top individuals brought no premium and offered no incentive for the efficient producer.

"We had our Shepherd's Club in the county at that time, same as we do now, and a number of us were pure-bred raisers who were interested in seeing registered rams used to head up local commercial flocks. So we got together with our county agent and the Extension people up at Columbus and with the cooperation of our local market started these lamb pools. The only requirement a farmer must meet in order to be eligible to sell in our pools is that his lambs must be sired by registered rams. This has been the case generally throughout the state although several of the pools have relaxed the requirement since just about all the sheepmen around here are now pretty well convinced of the truth of the old saying that 'the ram is half the flock,' and they're all using the blockiest and best mutton type rams they can find—Southdown, Shropshires, Hampshires, with some of them turning to Suffolks, Cheviots, Dorsets, and Oxfords.

"We realized that even our best native ewes couldn't do the job for the commercial raiser that the coarser looking, thrifty foraging, range bred sheep could. So we began the upgrading of our commercial flocks by importing these hardier, parasite-free foundation ewes by the carload from Montana and Idaho and Colorado and from anywhere in the range country we could find good stock for sale. They were big in bone and frame. They were good mothers and being largely from Rambouillet strains they turned off a good crop of wool as an extra dividend.

"The next steps were to do a job of providing feed for the flocks and making sure that feed was going into meat and wool and not into a banquet to make a few million worms and ticks fat and happy. Every man has his own management and feeding programs, of course, but in general we've come to look on legume pastures as the base of all our operations. Some of these fellows around here have done an almost unbelievable job with their pastures. Mine aren't anything out of the ordinary, but I've been able to carry better than 600 head of lambs on 65 acres for the last three months and this summer

And runs it across the scale to join others of its grade in the holding pen.



Result: Uniform carcasses on the rail; extra dollars in the farmer's pocket; tastier cuts in the market basket.

certainly isn't one that's going to be remembered for its rain, either.

"What sort of stuff did you have on those 65 acres?" was the inevitable question from a farmer who up to this point had been quietly listening to Bitzer's sheep lore.

"Well, I guess it's not much different than what the rest of you sow except that I like to add a little orchard grass," Bitzer answered. "I've been following a five-year rotation of corn, small grain and three years of meadow. The meadows are mostly alfalfa, my mixture running seven pounds of alfalfa, two pounds of brome grass, a half pound of ladino clover, one pound of alsike and two pounds of orchard grass. My neighbors just can't understand why I use orchard grass; they claim it gets woody and unmanageable and all that. But I've always found that it's easy to get a stand of the stuff; it's deep rooted and makes for good pasture in the middle of summer and best of all so far as the stock are concerned, it's palatable. If, in early May the brome and orchard get too rank, they must be mowed right when the pasture is new or they will choke out the legumes. Handling grass in early May is a trick you have to do to prove this to yourself.

"I have a good 15 acres or so in bluegrass pasture, too. That's for early spring and late fall.

"We get some mighty fine hay with plenty of protein from that mixture and fed with a little grain, say about a pound of shelled corn to 12 pounds of hay, it keeps our ewes gaining and in good condition all winter.

"As I mentioned before, there's no use knocking yourself out making good pastures if you're not going to do anything to control the parasites. When I buy sheep I drench them with phenothiazine immediately even if the fellow I bought them from swears he just treated them yesterday. Then I follow the regular Ohio parasite control program which consists of four drenches a year, spring, summer, early fall and late fall; or what you might call a pre-pasture drench, a weaning-time drench, a breeding-time drench and a pre-lambing drench. During the summer we keep a mixture of one part phenothiazine to nine parts salt before the flock in self-feeders.

"One good dipping during the summer with Lindane or Benzene Hexachloride dips will lick the ticks and external parasites.

"Long tailed lambs and bucky lambs are a couple of other points we've always been finnicky about in our pools," the sheepman continued. "The bucky lambs with their heavier heads and shoulders make lower quality meat. A long tail with all its filth is an invitation to flies and maggots, so castrating and docking is standard practice in these parts."

"Have you ever tried an elastrator?" came another question from Bitzer's growing audience. "Those things really do a neat job and there's no fuss and no mess. No trouble from flies either."

"I use a Burdizzo Clamp," commented another farmer, "that's a mighty handy tool, too, and I've had a lot of success with it."

Most of the others who voiced any opinion were content to stick with the knife. "Otherwise you're going to lose a lot of good Ohio oysters," was the feeling.

Topping Out

Bitzer made no comment on that one and got back to his story. "When the lambs are ready to be shipped these boys start to work on them right on the farm," he went on with a nod toward Bill Johnson and Lowie Kuhlwein, a couple of the yard men who were grading and weighing the lambs.

Johnson straightened up and leaned against the side of the pen as the last of a bunch of extra good lambs bounded from his grasp and onto the scale. "And don't think that job hasn't gotten a lot easier, too," he commented. "Why man, a farmer would call in here and say he wanted us to come out and top out his lambs. We'd hustle out to his place and find the flock scattered all over Hell's Half Acre. It's gotten so now, though, that they really see the value of topping out the crop and when we go out now we usually find the lambs shut up in the barnlot so we can do our job in short order and be on our way to work on another flock.

"Used to have plenty of arguments about the grading here in the yards, too. Every time we didn't mark one quite as high as the farmer thought we should he'd squawk."

At this, Bitzer broke in: "Every time there was any question about grading these fellows would invite the farmer to step into the pen and *feel* the difference between lambs. You have to feel under that wool. You can't see grades on lambs like you can on cattle and hogs. It's very seldom you ever hear any complaining about grading around here anymore. A fellow who used to think all his lambs were tops will come in now and admit that although his crop is pretty good it's not quite what it should be. That shows he's getting sheepwise."

Try It Yourself

That last remark brought a quick response from Elmer Haymaker, an Oxford breeder of long experience and one of the directors of the Fayette County Shepherds Club. "I think I've been handling sheep about as long as most of you fellows around here," he began, "and you know I never question your grading, Bill; but a lot of times I still can't see the difference between a lamb you'll mark double blue and one that comes out with just a single on it. How do you do it?"

"I guess it's a matter of constantly working with hundreds of lambs that eventually gives a fellow the eyes and the hands of a grader," Johnson began to explain. "But look here, you're no different than the rest of these fellows, step in here and let me show you on a couple of these.

"First of all, *look* at them. We want lambs around 85 pounds or larger in our top grade, don't we? A man with your experience doesn't have any trouble picking out the lambs in this pen that will hit around that weight.

"Now feel this one," he continued as he grabbed a blocky lamb with plenty of weight. "Put your hand down under the wool and feel along the ribs, then feel over the loin. This is a good one, but I'd say it just doesn't have the fleshing it should have over the rib and loin to make a double blue. Let's try another one."

He felt one or two more good looking

Flock owners are always in the market for young rams like these Oxfords bred by Elmer Haymaker of Fayette County, Ohio.

UREA

The Synthetic Chemical that Helps Cattle Digest Cheap Waste Feeds

A world in miniature--a 2000 times enlargement of a cellulose fiber out of the rumen of a steer. The filmy arc of cellulose (see arrow) is being digested by cocci bacteria (the black spots). Scientists believe that the more we increase the bacteria in a steer's rumen the easier it can digest cheaper cellulose feeds. Protein causes the bacteria to multiply.

Spring and lamb just seem to go together. Every lamb crop has its orphans and it's a lucky orphan that finds a foster Mama like this one.

individuals and finally turned to Haymaker with a satisfied look. "Try this one."

As Haymaker began his exploration under the wool, Johnson pointed out the highlights, "Feel that fat and finish on the ribs and over the loin? You can't argue with that, can you? That lamb's just yelling 'prime condition' right at you. After all that's what spells a double blue —quality and weight plus prime condition. The single blues have quality and weight too, but they're just a shade short on condition. It's just something you have to feel and it takes a while to get that sense of the difference. When you get down to the reds you're looking for lighter lambs that don't have the finish of the other grades but which will still produce a carcass that will grade good."

"When I cut one up for my own locker," said one of the farmers, "I'll take a single blue every time. Too much fat on the double blue. Can't see why a packer pays more for them."

One of the packer's men said, "Abe, people in the Mid-West don't eat this meat. Lamb is Eastern food. Almost all our double and single blues go to New York and Boston. These lambs need that fat to carry them that shipping distance and assure quality of the product."

The operation of the pool itself is actually a very simple thing. Most pools limit the lambs to a minimum weight of 75 pounds and a top of 100 pounds and, as Bitzer noted, they are sired by registered rams. The marketing end is usually handled by one of the cooperative marketing organizations since these groups have worked with the Extension Service in pioneering the activity. A lot of independent brokers, however, have been watching the growth of the pools with a careful eye and are already working with county improvement committees to market lambs on a graded basis.

Pools are generally held on the same day every two or three weeks. Some farmers ship lambs direct to the pools. Others call the marketing organization for assistance and, as Bill Johnson explained, one of the graders comes to the farm and tops out the individuals that are ready to go. There is no charge for this service.

Grades

The grades vary somewhat from pool to pool, selection being on a more rigid basis in some pools than in others, but in general they run as follows:

Double Blue—Prime lambs of thick, lowset conformation that are capable of producing the highest priced cuts. They average 90 pounds or a little more and yield better than 50 per cent.

Single Blue—Choice lambs weighing 85 to 90 pounds and in good condition.

Link Blue—A grade not used in all pools, but made up of heavy lambs carrying a good finish, but too large to furnish the kind of cuts in most demand by the trade.

Red Dot—Lambs that lack the finish necessary for the top grades. They will usually grade out utility on the hook and yield around 44 or 45 per cent.

Yellow Dot—Common, shelly, light lambs so lacking in condition that they are undesirable for either slaughter or further feeding. These are often the victims of uncontrolled parasite infestation, or the result of lack of good pasture and management.

The Fayette County pool is one of the most selective in the whole state, being in the very center of the top lamb producing area. On that market only four classifications are used, Double Blue, Sin-

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UREA is a new cattle feed. It looks like sugar, tastes like salt, with a stinger added. All ruminants, cows, goats, sheep, benefit from urea; animals with one stomach, like hogs, horses or poultry, can't make use of it and may be harmed by large amounts of it.

Urea is made from ammonia and carbon dioxide and by itself has no feed value. Urea, is like judo, in that when used at the right time and the right place, a little push has the value of a ton of bricks.

When you feed a 1,000 pound steer a tablespoon of urea, the bacteria in the steer's rumen are galvanized into action. It is these bacteria, by eating, growing and propagation, which make protein. Through their activity in the rumen, they convert inexpensive roughage into costly protein. When the usual protein concentrates are high or scarce, urea is a good out for the cattleman.

Before getting into the history, use and supply of urea, let's get the dollar factor behind us.

Two and a half pounds of 40% soy bean meal costs 12 cents and from it the cow makes one pound of protein. The same amount of protein is made by the cow when three cents worth of urea is added to her feed. That's the arithmetic, but the road of the farmer who uses urea is not so simple for there are many compromises and qualifications in using it. When three cents does the work of twelve cents, you have to be on the ball all the way to make it work.

If urea is talked about in feed lots it's only a whisper compared to the interest in its future in plastics, fertilizer and a dozen minor industries. Urea is crystaline and when magnified 247 times it has the pale, gem-like effect shown on the cover of this magazine.

Farmers always have had urea around their barnyard, for in its natural form urea is the final waste product from protein feeds and it leaves the body of animals in the urine. The bedding in the loafing barn soaks up the urine with its urea.

The mention of nitrogen and ammonia in connection with urea brings us a clue in understanding what urea is and how it works, in feeds and in fertilizer. When urea was first discovered in its natural form by a Frenchman, Hiliare Rouelle, he thought that only life processes could produce this organic material. Rouelle and other early scientists found it in the blood, in milk, and in other animal fluids. In 1820 a German, Fritz Wöhler, discovered a way to make urea in a laboratory; it was the first organic chemical ever made synthetically. Since that time it has had several rebirths, and it can be made synthetically in a number of ways.

The chemical formula of urea—NH_2 CO NH_2—indicates that it is made by combining ammonia and carbon dioxide.

Commercially, urea is made in a large, specially designed chemical plant, which calls for high pressures and lots of heat and power. Cost estimates for a 150 ton a day urea plant are in the neighborhod of 3½ million dollars. An ammonia plant is necessary, too, and that adds about 4½ million more. This cost accounts for the fact that there are only two large plants in the country at this time producing urea on a commercial scale. These are the Barrett Division of Allied Chemical and Dye, and DuPont. Although urea is scarce today, and may always be scarce, there are other plants in the planning stage, and one company in the farm field, John Deere, has recognized its tremendous potential for farm use and is building a plant in Oklahoma. The Deere plant will use the Pechiney process for making urea, which was worked out by a French engineer. The Vulcan Engineering Division of The Vulcan Copper and Supply Company of Cincinnati has rights to the Swiss "Inventa" process and will design and build complete plants using this efficient chemical process. The Inventa process has been in commercial operation in Switzerland for several years.

Inside the Rumen

In the dark, pulsating mass of semi-liquid food in a steer's first stomach there is an astronomical number of micro-organisms, as many as 90 billion in a gram of rumen contents. (That's a space about the size of the eraser on your pencil.) Somewhat like the bacteria that live on the roots of legumes and help the farmer build nitrogen into the soil, most of these rumen bacteria are friendly busy-bodies. They are anerobes, that is, they will not live in the presence of air.

With a microscope of high power great numbers of these minute bacteria actually have been seen and watched. Of these, two general types have been isolated: rods, looking very much like little sticks, and cocci, which looked like clusters of grapes.

The exciting discovery in this microscopic world was that these bacteria could attack and consume fibers of cellulose, that is, straw, corn cobs, corn stocks and other farm products thought to be of little value. Searching further into the activity of these bacteria it was found that they made a definite contribution to the functioning of the rumen. If we say that they help "digest" the food we are telling only half of the story, for it was found that they could do two things: (1) They could crack the hard shell of cellulose fibers in roughage, and, (2) they were converters, that is, they could synthesize the roughage the cow ate into useful feed. For instance, they convert some of the food into the important B-vitamins. Using one of the liquids a cow secretes into the rumen, an enzyme called urease, the bacteria are able to convert the nitrogen found in hay and other foods into useful proteins. These self-made proteins are passed along and digested in the other stomachs of the cow. Since pigs and horses do not have a rumen or any other spare stomach, they cannot make this same efficient use of roughage.

UREA can be used to supply about one third of the protein in a feed for cattle and other ruminants if it is thoroughly mixed with the rest of the feed. The greatest drawback to its use today is its scarcity.

So we see that the results of feeding urea to animals of the ruminant classification is based on the theory that scientists believe it increases the activity of the bacteria in the rumen. With the increase of bacteria numbers and in the work they do they are able to convert more of the roughage into useful food.

In the field of Bio-chemistry, one of our newer and most challenging sciences, the mystery of how the bacteria convert cellulose into useful food has not been solved. For although the scientists have been able to break down proteins into amino acids they have not been able to create a protein molecule synthetically. But these minute rumen bacteria can manufacture the protein molecules with speed and accuracy, breaking down complex substances like cellulose and turning them into usable proteins.

(Continued on page 94)

Running out of corn before the cattle are ready for market is not the catastrophe it once was. A few feed facts, once we learn and remember them, will teach us how to feed cheap feeds, how to substitute one for the other, and how to dodge the high-priced feeds. Today, we are fattening animals on feeds that a generation ago were regarded as fit only for burning or bedding.

When beef is high and pork is low, the housewife buys pork; by taking a page from his wife's cookbook, the farmer can juggle his feeds to beat high prices. And he need not sacrifice quality, or speed of gain.

The trick is to make the most out of the cheap feeds by loading up on them and, at the same time, offsetting their weakness with the right concentrate.

A feed is usually cheap because it is a poor feed. Especially, this is true of the roughages. There is a long list of high-cellulose roughages which are plentiful as well as cheap, because most of them are now put to a wasty use. They include corn cobs, all kinds of straw, corn stover, oat hulls, cottonseed and peanut hulls, grain seed screenings, kelp, citrus pulp, pea vines, No. 3 hay and various industrial by-products. How can you put feeds like these to better use on your farm?

Let's Look Inside First

From the explorations of such scientists as Burroughs, Gall, Hart, Harris, Loosli, Thomas, and others, into one of the most amazing wonders of nature, the cow's rumen, we have available new facts on how the cow digests roughages. "Bugs" inside the rumen break down the cellulose in roughages. To fatten on cheap roughages, your steers or cows must digest them; and to do that the animal needs to be supplied, some way, with more bugs in the rumen.

These bugs eat more than cellulose. They are about as cosmopolitan in their appetite as the cow herself. A shot of sugar, starch or protein makes them thrive and multiply. The pay-off to the farmer is having these bugs eat their way through low-priced cellulose roughages.

Since there is more cellulose roughage in the world of feeds than any other substance, and since the proteins we feed cattle are the most expensive items in their ration, any way by which we can turn cheap cellulose into animal flesh is a dollar maker.

Building cheap feed for your own cattle gets down to this simple sentence. Shovel as much low-cost cellulose roughages into them as you can, and encourage the bugs in the rumen of the cow to eat the cellulose by "hopping the bugs up" with the most economical sugars, starches and proteins your local market affords.

To do this, without cheating the cow, requires some doing. Each one of the feeds are complex in themselves and we are likely to become entangled when we substitute one for the other.

For example, shelled corn is thought of as our most high-in-starch feed; yet, it also contains 8% protein. If we substitute corn cob meal for part of the shelled corn we must make up the

90%

This line represents the basic make-up of

carbohydrates

starch (corn and other grains)
sugar (molasses)
cellulose (roughages, hay, fodder, cobs)

protein loss in some other way, since the cob in corn cob meal contains little or no digestible protein.

Perhaps we can get at the core of the answer by using the 90%—10% line at the bottom of this page.

The ordinary grown cow, sheep or goat requires roughly 90% carbohydrates and 10% proteins to grow and flourish. To that we add minerals, vitamins; salt and bone meal are constants in all feed formulas. But we can juggle the proteins and carbohydrates, substituting one for the other up to a point, and reduce the cost per pound of gain in an animal. We can substitute cheap feeds for the less plentiful and expensive feeds, and let some cellulose roughages pinch-hit for the expensive proteins.

Protein Means Energy

Pound for pound, proteins supply the animal with a higher percentage of nutrients from which muscle, milk and locomotion come than any other feed in a ration. Proteins are easily and almost completely digested.

They are also the most expensive animal feed. The old standbys, soybean, cottonseed and linseed meals, as well as the rarer types, fish meal and tropical seed meals such as cocoanut and tung, are near each other in price, averaging around five cents per pound, though they vary considerably in their protein content. Using the cheaper ones, from the standpoint of actual protein content, is the first step in working out a low-cost feed. The proteins go on the 10% side of your yardstick.

So does urea; although today its manufacture is so behind in orders it cannot yet be bought by the bag. From urea, a synthetic chemical, the cow makes part of the protein it requires; see page 57.

From Dr. Orville Bentley of the Ohio Agricultural Experiment Station at Wooster, comes this advice. "Urea, being a synthetic product of high nitrogen content, can replace some of the protein in a feed. When it is fed, it is necessary to add energy in the form of grain or molasses to keep cattle gaining flesh. When you can get urea, a good rule of thumb is to feed whichever of these two is cheaper; (a) 1 pound of urea with 8 pounds of corn and cob meal, or (b) 6 pounds of soybean meal. With $1.50 a bushel corn and urea at 6c a pound, this brings the 9 pounds of urea-corn mixture to about 34c; the 6 pounds of soybean meal will cost 30c, using $100 a ton soybean meal. You can save the 6c and have approximately the same feeding value."

Continues Dr. Bentley: "Experimental work has shown that urea can be used to replace as much as one-third to one-half of the animal's protein requirements. Higher levels may poison the animal, the symptoms being bloat, tremor, or even death."

Why Add Protein?

Although our yardstick shows that all animals need carbohydrates (sugar, starch and cellulose) and protein (bean meal), the fact to remember is that half the ruminents on the face of the globe rarely get as much as a half pound of sugar or starch a

a balanced ration for farm animals

10%

protein

concentrates (soybean meal)
good hay (alfalfa, clover)
grain (corn, oats)
urea (synthetic proteins)

day. Their feed comes solely from pasture grass which is primarily cellulose and 6 to 10 per cent protein. Wild ruminants in their natural state, deer, moose, elk, buffalo, zebus, obtain what little sugar or starch they eat from browsing seeds off the tops of grasses. In a few sections of the world, where rain falls as drizzle, mist or light rain, the ground has not been leached of its nutritients and cattle actually gain enough flesh from grass to go straight to the packer without extra sugar, starch and protein concentrate being added to the ration. The best known such section in the United States is the Sand Hills of Nebraska.

Elsewhere, aside from exceptionally fertile farms, ruminants can only keep up their growth and maintain their body weight on grass. They cannot get enough nutrition from it to give milk to more than their calf, or make fat.

Our improved seeds give greater yield to the acre but usually they do not give greater amounts of sugar, starch and protein to the bushel. Mostly, only the cellulose content is increased not only by the acre but by the bushel. The rest of the nutrients are stretched out, cellulose making up most of the extra yield.

Let's take one example: the old common dent yellow shelled corn gave 10% protein and 20 to 30 bushels to the acre. The new hybrid corn gives 8% protein and 40 to 80 bushels to the acre. By the acre, the farmer gets *more* corn and *more* protein, but by the ear, the cow gets less protein.

That's why we have to make up the difference or find a way to cause the cow to digest and make fat out of the extra cellulose.

The Carbohydrates

There are only three carbohydrates—starch, sugar and cellulose.

Common farm grains, corn, wheat, barley, sorghum and oats are high in starch: there are also the less common ones such as buckwheat and millet and hominy meal. Potatoes, both sweet and Irish, are good starch feeds.

Corn is the farmer's favorite starch for animal feed because it is ordinarily the easiest grown and the cheapest. With small adjustments in the ration, one grain can be substituted for the other, when price or supply make it practical. Barley, rye, oats and sorghum grain have a feeding value roughly 90% to 95% that of corn, buckwheat 75%. Wheat and hominy meal are equal to corn and can be substituted right down the line. Feedwise there is very little difference between them.

Potatoes, like the grains, make good starch feed if you can buy them cheaply; in Europe, where potato yields are large, they are a standard animal diet. In this country we can raise more grain with less effort, and potato feeding is practical only in potato areas such as Maine, Idaho and Washington, where cull potatoes can be picked up at grading warehouses at $5 or $6 a ton. Potatoes are low in protein (about 1%) and heavy with water. It will take 400 to 500 pounds of them to equal 100 pounds of corn. Up to 20 pounds a day can be fed as your starch ration, but you'll need to get the other two carbohydrates (sugar and cellulose) from something else, and you'll also need to add protein.

Molasses, the Roughage Buster

Sugar, the second carbohydrate, digests the fastest. It is used less in the North, but has been used as a cattle feed in the South for many years where it is better understood and has less freight on its back. Cane molasses, or black strap, is the most common and the cheapest. By substituting molasses (which digests fast) for some of the starch (which digests medium fast), the farmer hastens the growth and work of the bugs in the rumen.

Molasses is usually thought of as a feed that makes poor hay palatable. While true, this is a questionable advantage because it may encourage the cow to eat mouldy or part-rotten feed. The wonderful use of molasses is that it digests fast and encourages the growth of the bugs in the rumen that break up the cheap roughages. You might call molasses a *roughage buster*. Feed a cow just roughage and she may starve; her digestion is so slow she won't get hungry enough to eat her fill, and she will digest less of what she eats. Add molasses and the bugs in the rumen multiply, bust up the rough-

ROUGHAGES AND THEIR FEED VALUES

	Relative T.D.N. Value for Wintering	*Relative Energy Value for Fattening*	*Crude Protein Percent*	*Crude Fiber Percent*	*Relative Lignin Content*	*Practical Comments*
Corn silage (1) (2)	100	100	7.0	19	Low	When fed with protein and calcium supp. Tops in pounds of beef per acre.
Sorghum silage	95	90	5.0	22	Low	Equal to corn silage which has fewer ears.
Legume silage	70	70	12.0	27	Low	Value higher when fed with energy source.
Grass silage	75	75	9.0	28	Low	Value higher when fed with energy source.
Pea vine silage	70	70	12.0	25	Low	Value higher when fed with energy source.
Beet top silage	70	70	11.0	12	Low	Feed with liberal source of calcium.
Good legume hay	85	70	14.0	25	Low	Valuable as source of protein and calcium.
Poor legume hay	80	60	11.0	35	Medium	
Good grass hay	85	65	8.0	30	Low	
Poor grass hay	75	55	5.0	32	Medium	Include trace minerals in ration.
Sorghum fodder	85	60	6.0	25	Medium	
Oat hay	80	65	8.0	28	Medium	Nitrate poisoning possible.
Corn stover	75	55	2.0	27	Medium	
Corn cobs	75	55	2.0	32	Medium	
Citrus (pulp, dry)	74	55	5.9	11.5	Medium	
Oat straw	75	40	4.0	36	Medium	The value of these feeds for fattening cattle will vary with the amounts fed and the presence of other essential nutrients.
Oat mill feed	60	30	5.0	28	High	
Wheat straw	65	20	4.0	37	High	
Wheat chaff	60	15	4.0	29	High	
Cottonseed hulls	70	50	4.0	46	Medium	
Sugar cane bagasse dried	75	55	1.0	50	Medium	
Peanut skins	60	55	16.3	11.8	Low	
Peanut hulls	40	10	6.0	60	High	

(1) Well eared, well matured corn silage used as standard.
(2) Actual values of silages are multiplied by three to place them on similar moisture basis with air dry roughages.

COSTS OF PROTEIN

Feed	*Percent Total Protein*	*Price per Ton* $80	84	88	92	96	100	104	108	112	116	120	124	128	132	136
		Price per Hundred Pounds 4.00	4.20	4.40	4.60	4.80	5.00	5.20	5.40	5.60	5.80	6.00	6.20	6.40	6.60	6.80
Wheat Bran Mixed Dairy Feed	16	.25	.26	.28	.29	.30	.31	.33	.34	.35	.36	.38	.39	.40	.41	.43
Wheat Standard Middlings	17	.24	.25	.26	.27	.28	.29	.31	.32	.33	.34	.35	.37	.38	.39	.40
Mixed Dairy Feed	24	.17	.18	.18	.19	.20	.21	.22	.23	.23	.24	.25	.26	.27	.28	.28
Brewer's Dried Grains	25	.16	17	.18	.18	.19	.20	.21	.22	.22	.23	.24	.25	.26	.26	.27
Corn Gluten Feed Distiller's Dried Grains	28	.14	.15	.16	.16	.17	.18	.19	.19	.20	.21	.21	.22	.23	.24	.24
Mixed Dairy Feed (32-33-34%)	33	.12	.13	.13	.14	.15	.15	.16	.16	.17	.18	.18	.19	.19	.20	.21
Linseed Meal (33-38%)	35	.11	.12	.13	.13	.14	.14	.15	.15	.16	.17	.17	.18	.18	.19	.19
Soybean Seed	39	.10	.11	.11	.12	.12	.13	.13	.14	.14	.15	.15	.16	.16	.17	.17
Soybean Meal (38-43%) Linseed Meal (38-43%) Cottonseed Meal (38-43%)	41	.10	.10	.11	.11	.12	.12	.13	.13	.14	.14	.15	.15	.16	.16	.17
Corn Gluten Meal	43	.09	.10	.10	.11	.11	.12	.12	.13	.13	.14	.14	.14	.15	.15	.16
Cottonseed Meal (over 43%) Soybean Meal (43-48%) Peanut Meal (43-48%)	45	.09	.09	.10	.10	.11	.11	.12	.12	.12	.13	.13	.14	.14	.15	.15

Cost per pound of protein is found at point where horizontal line from feed in question intersects vertical line downward from price per hundred pounds.

TO PUSH beef cattle to prime finish takes corn and more corn along with lots of protein concentrates. Most feeders work toward good and choice grades because cattle can be brought to these grades with the cheaper feeds.

age, the cow digests more of it, passes it out, and gets hungry again.

Molasses is also used as a carrier for urea.

A shortcut in getting protein into molasses is being tried by Commercial Solvents of New York City who are ammoniating molasses. The product, Molatein, contains 15% protein equivalent and sells for about $10 a ton over the going price of molasses. Molatein flows better than molasses. It doesn't have the licorice taste of molasses but the ammonia that has been added does change the taste slightly. In 1941 Quaker Oats of Chicago tried ammoniating dried sugar beet pulp, to which molasses had been added. Today, Quaker Oats is ready to announce a new ammoniated concentrate, "Furameal."

Using Three Cheap Ingredients

How can a cheap sugar (molasses), a cheap cellulose (cob) and a cheap source of protein (urea) become a feed? Roswell Garst of Coon Rapids, Iowa, has 6,000 steers on a mixture of 89% molasses, 11% urea (*fed free*), plus cobs (*fed free*), plus corn stover fed the same way. Salt and minerals are boxed and also fed free. The cattle gain ½ to ¾ of a pound a day.

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HIGH ENERGY FEEDS COMPARED WITH CORN

	Relative Energy Value	*Crude Protein Percent*	*Crude Fiber Percent*	*Calcium*	*Phosphorous Percent*	*Comments*
Corn (1)	100	8.6	2.0	0.02	0.27	No. 2 dent, 15% moisture.
Hominy feed	106	10.6	5.0	0.22	0.71	5% or more fat.
Wheat	100	13.2	2.6	0.04	0.39	More difficult to keep cattle on feed when wheat is only grain.
Sorghum grains	96	11.0	2.0	0.02	0.32	
Corn and cob meal	89	7.3	8.0	0.02	0.22	Grind through ⅜-inch screen.
Barley	88	12.7	5.4	0.06	0.37	
Rye	88	12.6	2.4	0.10	0.33	Mix with more palatable feeds.
Oats	85	12.0	11.0	0.09	0.34	Value higher if used as one-fourth of concentrate.
Millet	85	11.9	8.1	0.05	0.30	
Soft or immature corn	79	7.2	2.5	0.02	0.24	On dry matter basis, approximately equal to corn.
Buckwheat	76	10.3	10.7	0.09	0.31	Grind and mix with other grain.
Dried sweet potatoes	92	4.9	3.3	0.21	0.18	For undried feed divide by 3.
Dried potatoes	89	10.4	2.0	0.08	0.22	For undried feed divide by 4.
Dried beet pulp	85	9.2	19.8	0.67	0.08	For undried feed divide by 7.
Dried citrus pulp	81	5.9	11.5	2.07	0.15	For undried feed divide by 5.
Dried apple pomace	80	4.5	15.6	1.00	0.09	For undried feed divide by 4.
Cane molasses (2) (blackstrap)	65	2.9	0	0.74	0.08	Feeding value of molasses higher with poor quality feeds.
Beet molasses	65	8.4	0	0.08	0.02	
Corn molasses	70	0.2	0	0.50	0.05	
Citrus molasses	65	4.0	0			

(1) Yellow corn used as a basis for comparison.
(2) Cane molasses is a good source of trace mineral elements.

HAY CRUSHERS

Faster drying, leafier, more nutritious and palatable hay can be made with these new hay machines

IF THEY ALLOWED BETTING on haymaking, the bookies would give you about two to one against your getting in your first cutting of hay without being caught in a shower—that is, if you make hay the old-fashioned way. If you use one of the new hay crushers your chances are twice as good in this haying gamble. Many farmers have been able to beat the rains with the crusher.

The machines which help beat the gamble of haying are giant steel wringers through which the fresh cut hay is rolled. Without squeezing any of the juice out of the plants, they speed the drying process of alfalfa to half the usual time and of soybean hay to a third the time it normally takes. The faster drying comes about by the splitting of the stems of the plant as they go through the rollers. Split lengthwise, the stem is no longer a tube which can hold moisture while the leaves dry and become brittle — it is cracked into several smaller parts and its moist inside is brought in contact with the air and dries as fast as the leaves do.

During good hay-making weather in the corn belt, crushed hay has been baled the same day it was cut and there was no heating of the bales because of moisture. The fast-drying hay holds onto its leaves and comes through the curing process a rich green color which seems to go with more carotene and protein saved. Cows show how much they like it by cleaning up all the hay in the rack, coarse stems and all.

Two companies manufacture these crushers, The Food Machinery and Chemical Corporation which makes the John Bean Haymaker, and the Meyer Manufacturing Company which makes the Hay Conditioner. Three models of the Bean Haymaker are available; one with its own seven-foot mower, another utilizing an owner's 25V or 27V International mower, and a third without a mower attachment making it possible to mow with one tractor and to follow with the Haymaker behind another tractor. All Bean Haymakers are of the trailer type. The mower is mounted out to the side so that on one round the mower is cutting a swath and the hay crusher is picking up and crushing the hay from the last round. The Meyer Hay Conditioner has one model with the mower to the side and the crusher following the tractor. The other Meyer machine comes without the mower.

THE MOWER is part of the crusher on most models, but Laybourne's old mower was too good to throw away so he bought the crusher alone. The high protein crushed hay can replace some dairy supplement.

Both crushers are operated from the power take-off of a two-plow tractor and both weigh about a ton with the mower. Each machine can handle a seven-foot swath of hay.

In operation, a toothed pickup lifts the hay from the swath and feeds it between the two steel rollers which are forced together under an adjustable spring pressure system which can squeeze up to two thousand pounds per square inch. The amount of pressure used depends on the condition of the crop. There should be enough pressure to crack the stems thoroughly, but not quite enough to squeeze out any of the juices for much of the food value is in the juice. The pressure is easily adjusted with a crank-type wrench. The hay passes through the rollers and is laid like a broad ribbon on top of the stubble. The stems feel moister to the touch than with uncrushed hay, but as soon as the leaves get the least bit ratly it is time to windrow the hay. Most hay will take into the second day to be dry enough to be baled, but in very good haying weather baling can be done the same day as cutting.

The first question which comes to most farmer's minds is: Is it worth the cost of another heavy piece of equipment to speed up the hay-making? And is it worth the operating cost of dragging an extra ton of steel over the fields?

O. T. Laybourne, of Springfield, Ohio, has used the Meyer crusher on the 25 acres of hay on the home farm and on the 35 rolling acres of hay on the adjoining farm operated by his son-in-law, Gene Woodard. Laybourne feels that after two years of use he has some of the answers to these questions.

You can't be with Laybourne for more than an hour or two without hearing him say, "I'm a cheap skate, a real dyed-in-the-wool cheap skate, and if there's anything I hate worse than spending money it's losing money. We feel sure that the crusher will pay for itself in three or four years by the improvement of the

quality of our hay. And if the machine more than pays for itself in improved quality, think of the time when it saves us a whole cutting of hay. Before we start cutting we look up the weather forecast or put in a long-distance call to the airport at Vandalia and get their long-range forecast, but even so a rain used to catch us with hay down once in a while. In the two years we've used the squeezer we've not been rained on and I've heard of farmers who have used a crusher for four years without being caught by a shower. Remember, the shorter the weather forecast, the more accurate it is bound to be, and the money lost in one ruined cutting will go a long way toward buying a squeezer.

"But to get back to the improved quality of the hay," Laybourne continued, "just look at some of the hay and see how green and leafy it is after it has gone through the squeezer. A neighbor of mine who's a pretty shrewd dairyman is offering four dollars a ton more for crushed hay than for uncrushed hay. I figure that if it's worth that much more for his cows it's worth just as much for our Holsteins. And that's not the only saving. My son, Harrison, and my son-in-law, Gene Woodard, say they have been able to cut down on their protein supplement because the crushed hay feeds out better."

"I've more or less experimented with the hay feeding this year," said Harrison Laybourne, who operates the home farm, "and I've found that instead of feeding thirty-two per cent protein supplement as I did last year, I can get by with sixteen per cent supplement without a drop in milk production. Woody and I both have found that there is much less hay wasted in feeding when you're using crushed hay. I'd say that the saving would amount to as much as a third of the hay fed on the first cutting hay.

"The cows don't pick through the hay and eat the fine stuff and leave the coarse when we feed crushed hay," Gene Woodard added. "I'm feeding a little over fifty head right now and I never have as much as two good forkfuls of coarse hay left in the racks at the end of a day. The reason is that the stems are more limber and pliable after they've gone through the squeezer and the cows will eat them right along with the fine stuff."

During the winter when the hay is being fed in the loafing sheds of the two farms the big cows munch away at the hay, their tongues steaming in the cold air as they reach out for more. Coarse and fine hay is all cleaned up. Gene Woodard broke open a bale of second cutting hay which hadn't been crushed and compared it with a pad of first cutting crushed hay which he pulled out of the feed rack. The first cutting hay was coarser and stemmier, but there was no doubt about its leaves being greener, its flowers more purple, and its aroma sweeter

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THE TWO CRUSHERS, the Bean below and the Meyer on the opposite page, squeeze the hay just hard enough to split the stems without wringing out the nutritious plant juices. The stems then dry as fast as the leaves.

By Walter E. Thomas

BLOAT

There's a lot of uncertainty about what causes it, but little doubt about the results. It can be prevented.

One of the largest turnouts in many a month was on hand for the April meeting of the township Farm Bureau. The speaker had been imported from a neighboring state to tell about his phenomenal pasture program. After fifty minutes of color slides showing various shades of green in his pastures and a thorough outlining of his management practices it looked as if the question period could be dispensed with for a change.

Then came a query from the rear—"Those are mighty rich looking meadows, Mister, what's been your experience with bloat?"

"Never had a case in my life," was the answer.

"That's all right for you, but how about your cows?" asked the farmer.

To which the speaker, replied that his remark applied to his cattle as well as to himself, but was quick to add, "Don't ask me why."

The "why" of bloat has had a lot of people stumped for a long time. Because of the new emphasis on grassland farming and high powered pastures, it is now even more of a problem than it was twenty or twenty-five years ago. Looking for "bloat" in an almanac or veterinary guide published before the turn of the century is a fruitless task. It was known as "hoven" or "tympany" in those days, as it is even today in some parts.

If you've ever had any bloated stock you need no description of the malady. But let's hope that you're one of those fortunate farmers to whom "bloated" is simply an adjective the communists use in connection with capitalist. In that case it might be said that bloat is a condition in which the paunch or rumen becomes distended with gas. It is an affliction only of ruminating animals, cattle, sheep and goats, of course, being the principal ones with which the farmer is concerned, and it does not occur in horses or mules.

While it was formerly thought that it was the great pressure exerted internally that brought about death by causing poor blood circulation and difficult breathing, this theory does not stand up in the light of more recent research. A cow can actually be pumped up with a tire pump to a pressure that is even greater than that at which death occurs in bloat and no harm is done. The cow just belches faster and releases the gas. This seems to indicate that either a toxic gas is produced along with the bloating or that the normal paunch gasses are poisonous when under pressure.

If that seems a little vague, consider this statement from a report published by the USDA on the Conference on Rumen Function held in Chicago in 1951 and attended by over 70 leading research men: "Dr. Dougherty summed up the discussion by saying it was apparent that not too much is known about the fundamentals of bloat and the cause of death in cases of bloat. Aside from mechanical treatment, knowledge on treatment of bloat is also deficient."

To be practical about this thing, though, what are you going to do when you see one of your cattle or sheep with its left flank swelled out like a tumor or an old inner tube? Or to be even more practical, how are you going to prevent such a situation?

To begin with, let's take as much of the mystery out of bloat as possible. There are several known conditions under which the phenomenon occurs. In general, afflicted animals lose their ability to belch. This may sometimes be caused by an obstruction in the esophagus, as when the animal chokes on a tuber or root, or in some cases there may be a tumor or other growth that blocks the air passage. In the latter cases the individuals are probably chronic bloaters and should be disposed of as quickly as possible.

In the most common type of bloat free gas builds up on top of the ingesta in the paunch, the build-up being caused either by a relaxation of the vigorous contractions of the rumen needed to push the gas out or by some defect in the mechanism that causes belching. The paunch being closest to the skin of the left flank and as this area offers the least resistance to pressure, it is here that the greatest distention is seen when the animal bloats. This is also the spot where treatment must be given if it cannot be administered orally.

"Think they'd bloat on that ladino meadow this morning?" many a farmer has asked. The chances of bloat are a lot less if they have been well fed first.

A less common type of bloat is known as foamy bloat or frothy bloat. In this type the ingesta forms a great mass of bubbles and air spaces like the foam on a glass of beer.

There is no essential difference between bloat in cattle and bloat in sheep except that cattle seem to suffer much more severe cases than sheep, probably due to the fact that the paunch of a cow holds from ten to fifteen times as much feed as does the paunch of a sheep and can produce considerably more gas.

While the chronic bloaters seem to bloat on almost any kind of feed, more normal stock are most susceptible to attack on fast growing, fertile pasture that contains a high percentage of legumes. Ladino clover, white Dutch clover and alfalfa seem to be the chief offenders. In February of '52 a case was reported of four calves dying of bloat while grazing crimson clover in a pasture on the University of Alabama farm. There are no reported instances of bloating on birdsfoot trefoil or lespedeza though strangely enough, it has been found at the Kentucky Agricultural Experiment Station that less than a pint of extract from three pounds of green trefoil will kill a sheep in less than ten minutes. Cyanide poisoning is the cause of death in such cases.

Weather conditions have a lot to do with bloating. In Kentucky, 1951 was a particularly bad year. Bob Brame, over in Trigg County, turned his cattle onto a Ladino pasture one evening at five. He had a quick and expensive lesson in the inadvisability of such a practice when he returned to his field two hours later and found eight head dead. He went to work immediately with 2,4-D to hold back the Ladino growth and had no more loses.

Thomas Baker, another Trigg County farmer, had a similar experience. His solution was more drastic than Brame's, though. He plowed up the field and put in corn.

The winter of 1951-52 killed out a lot of clover in several Midwest states and with a dry spring and fall there was very little bloat last year.

Management Practices

When bloat is a problem in any particular area because of soil type, fertilization program, rainfall or other factors, the first rule of pasture management is to seed a mixture that is at least fifty per cent grass. While cases of bloat have been reported that were apparently caused by grazing heavily nitrated grasses, this is very unusual. If the legumes begin to get ahead of the grasses in a well established pasture, the application of a nitrogen fertilizer will provide a shot in the arm for the grasses and put them back in the race again. Then, when you have cattle or sheep grazing a mixture that has a bloating tendency, watch them. One central Kentucky farm lost 30 head of cattle on a White Dutch-bluegrass pasture in 1951. Finally a man on horseback was kept in the field at all times until the danger was past. When an animal was observed off to itself, restless, and showing signs of swelling it was kept moving until it was back to normal. Keeping the animal moving, incidentally, is the fundamental first aid treatment in bloat, the object being to try to induce belching again. Offering dry feed or forage at intervals helps, too.

Another important management practice is to avoid turning hungry stock into a field that is likely to cause bloat. Make it a point to feed hay or let them fill up on grass pasture first. There are apparently two good reasons for this. First of all, greed seems to have its disastrous consequences in stock just as surely and as quickly as in humans and it is usually the hungry, greedy feeders that are the most frequent

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Grass pastures like this one present no particular bloat problem. But when the legumes get ahead of the grasses, look out!

SPRING

By Louis Bromfield

Photographs by Joe Munroe

The deep snow has gone and the spring came suddenly in two or three days with brilliant sun and a few showers. I hope it is here to stay. The suddenness put a quick end to sugar-making. Good maple syrup weather means cold, freezing nights alternating with warm, sunny days. The nights have been mild, almost hot, and all the sap has rushed up out of the ground into the high branches and twigs, swelling the buds and casting a faint cloud of pinkish green over the whole of the woods. While the sugar run lasted, the camp became as always the center of farm life. On Sundays neighbors and people from town kept coming and going all day. It was a festival marking the wakening of the New Year. Plowing time came late this year but I was thankful for our well-drained hills and glacial soil which can be worked sooner than most farms of the Midwest.

The valley in which the farm lies is unbelievably beautiful with the steep wooded hills about it, the lake mirroring the blue sky and the trees ranging in shade all the way from the black-green of the hemlock against the red sandstone cliffs through all the soft pastel shades of green, some of it pink and yellow and pale red. The young foliage of the red oaks is a deep pink so that it makes the tree appear as if it were covered with deep pink blossoms. The white dogwood and the pink wild crab grow all along the edge of the forest above the water, and through it all runs the wide thick carpet of pale emerald-green sweet clover, slowly turning to brown as the earth swallows it up behind the tractors that move across the field like shuttles on a gigantic loom. There is no smell quite so good as fresh-turned sweet earth, and all afternoon it was tinged with the vanilla-like smell of sweet clover being crushed by the moving wheels of the tractor.

While we were plowing the dogs were with me and the crows tormented them all afternoon, descending quite near to them in a tantalizing way, only to leave the ground just as the maddened dogs came within a foot or two of them. They would chase the crows for an hour and then go down to the Clear Fork and throw themselves into the water, swimming about and lapping the clear, cold water greedily, and then return to the futile chase. They seemed to enjoy it although they got not so much as a crow feather as a reward.

In the afternoon a gallon jug of fresh buttermilk was brought down from the dairy. We kept it cool in the running spring water of the fork and drank when we grew thirsty. It was buttermilk made of sweet cream with little flecks of golden bluegrass butter floating in it. Once during the afternoon, I thought, "Paradise must be like this."

The willow cuttings carelessly disposed of along the creek began to root and grow and anchored the wandering bank.

In the first year we came to Malabar, Dan Quinn, the nurseryman, brought in two specimens of a semi-weeping, ornamental willow called Babylonica. Within three years we marked the tree as being of as much potential practical use as of actual ornament. The Babylonica never acquired scale nor harbored voracious insects, and the benevolent ladybugs, one of man's best friends, hatched out their eggs and fed their young upon it. When a sleet storm hit the Babylonica, it yielded and bent to the ground, but once the ice had melted it sprang up again into an upright position without the loss of a single twig. And it grew at a prodigious rate. A switch stuck into the earth in the spring produced a thirty-foot tree within three to four years. It never littered the earth as most willows do with dead twigs and branches, and its semi-weeping style of growth brought into the landscape the kind of misty beauty that is in Corot's landscapes.

Each spring for the first three or four years, I seldom went walking over the farm without carrying under my arm a bunch of willow switches, and whenever I found a likely spot for a willow I thrust the switch into the ground. Wherever I stuck a switch there are today trees from fifty feet upward in height.

The first use for the willows was on the banks of the farm ponds which we built. In the first years, before the whole farm was converted to good land use, there were sudden torrents after heavy thunderstorms which threatened to wash out the dams that held the farm ponds. The trunk roots of the Babylonica willow, we discovered, are much smaller than those of the average willow. Most of their roots made a fine network which bound together the soil of the dams so firmly that if a torrent came, the water ran over the dam without eating into it or causing the slightest damage.

After a few years the rapid growth of the willows on the dams developed trees of considerable size which (a) sometimes evaporated too much water, and (b) might blow over causing destruction to the dam itself. So we adapted a policy of cutting them back to stumps every year as the growers of basket willows do. To dispose of the cut branches and trunks we threw them along the banks of the wandering creek just above the level of the water; and then something wonderful happened.

The cuttings were thus disposed of in February and early March when the farm work was light, and we discovered that, as spring came along, all of the cuttings carelessly disposed of along the

On the island in the pond the grey Toulouse geese are fussing about, building their nests.

Near the "Jungle" straight young seedlings are growing. Underneath is a carpet of wildflowers.

The drainage pit is filled with water from the nearby fields. With good drainage the fields now grow fine alfalfa.

banks began to root and grow, anchoring the cut brush into the bank just at the normal water level. Even, bare, heavy trunks struck root along the whole of their length, and began sending out fresh green shoots here and there along the whole of their trunks. By the end of June the brush had all rooted and the banks were anchored for the summer, and from here on out, Niagara Falls could scarcely dislodge those willows. Where the willow mats advocated by the authorities were swept out again and again, the carelessly cast away willow branches took root and held, gathering silt and forming a new bank.

The Drainage Pond

We had two spots on the farm where it appeared unlikely that we could ever establish or maintain proper drainage without the use of tiles. They were both natural bowls surrounded by lips, in the one case about twenty feet high. The larger bowl covered about 12 acres of our best bottomland. There was no outlet and the bowl drainage also suffered from the fact that the run-off water from the adjoining county road ran into it. The 12 acres lying in the bottom of the bowl never quite became a swamp except during the winter and early spring, but it was impossible to farm since it was always too wet to plow until about the first of July and it was too wet to grow proper alfalfa or grasses. If we plowed it when dry enough in August and seeded to wheat, the wheat was drowned out during the winter. The only possible solution appeared to be tiling, but the estimates were discouraging. It would cost about $2500 to cut through the lip of the bowl in order to get enough fall to carry off the water. And in any case we preferred to keep the water on our own land and we did not like the idea of draining our natural fertility and our bought commercial fertilizer down the tiles in solution with water. Beyond that, there was the tiresome and sometimes expensive upkeep of tiling.

The solution came out of my memories of farming methods in Belgium, France, Denmark and Holland, so one Sunday we hired in a bulldozer and scoop that worked during the week on rebuilding an adjoining county road, and went to work. We dug in the dead center of the bowl at the lowest spot a pit twenty feet wide and ten feet deep. The earth which excavated (it was all topsoil from the adjoining hills) we merely leveled off on the surrounding area with the blade of the bulldozer. Then we planted fast-growing Babylonica willows along the edges both to evaporate the water and to bind the

May apples, trillium, hepatica and nearly every variety of wildflowers spring up when the cattle are fenced out of the woods.

The heifer will reach through the fence for the tender young sprouts, but does not touch the Multiflora Rose.

In the "Jungle" nature is free to produce her most luxuriant creations. On the opposite page the photograph shows the precise draftsmanship and tropical extravagance of foliage that makes up the skunk cabbage.

Louis Bromfield is presently engaged in writing a new book, to be called "Pleasures of the Country", which will be published later this year by Harper & Brothers. The selections in "Spring" are from "Malabar Farm" "Out of the Earth" and also published by Harpers.

banks against crumbling frost action in the winter.

The results were exactly what we hoped. The excess water, which formerly soaked the better part of the 12 acres until well into the growing season, all drained into the pit, making a pond of it for the larger part of the year. The following summer we planted the whole of the bowl to wheat and in the following March seeded the area to alfalfa, brome grass and ladino clover. The wheat flourished up to the very edge of the pond and brought us a big yield and the field is now in a heavy growth of meadow. The alfalfa, which will not tolerate poor drainage, is flourishing.

The whole job cost us $60 and an afternoon's work with bulldozer and scoop, instead of $2500 or more. We are keeping our water where it belongs and there is no expense of upkeep whatever, no clogging or breaking of tiles and for a part of the year at least we have another farm pond.

Not the least factor in the conservation of water at Malabar has been the treatment of the woodlots. There are about 160 acres of wooded land, most of which was pastured by sheep and cattle a couple of generations before we took over the land. The practice was poor management and the results in some parts of the woodland disastrous, for the animals found in the woodland had very little to eat and what they did find had little more nutritive value than so much old wheat straw. Forced to eat anything at hand, they had largely destroyed all the protective covering of forest vegetation—the ferns, the wild flowers, and, worst of all, the forest seedlings. Some parts of the woodland were little more than a handful of big trees of doubtful value with low-quality weeds and sickly grass growing underneath.

Our predecessors at Malabar were getting from that woodland neither any decent forage nor any succession of good timber. Much of the land covered by trees is rocky and rough and of little value if cleared even as pasture land, so the trees were left undisturbed but the woodlands were fenced to keep cattle out except where shade and water and what my Kentucky friend, Forrest Borders, refers to as "tramping ground" were left.

As to good forestry practices, we followed the advice of the Forestry people but not all of the way. The "ripe" trees, of which there were a surprising number left for some reason I have never been able to discover, were cut and used in remodeling the farm buildings. "Wolf" trees, or the trees which have no value but shut out sunlight and air and use up moisture and fertility, have gradually been removed. We have, however, permitted the old or dying trees to remain as dens for raccoon, squirrel and other wild life and we refused to clear out dogwood and wild grapes because they are excellent food sources for wild life and also add greatly to the beauty of the woods.

In the period of ten years since the cattle were first kept out of the woodland, a miraculous and beautiful change has taken place. The forest cover has returned with its carpet of ferns and wildflowers as well as thousands of seedlings of beech, maple, white ash, black walnut, hickory, tulip poplar and many kinds of oak. Some of these seedlings have already attained a height of twenty-five to thirty feet, according to the species, and all are straight-growing and smooth. Moreover, the wild-life population and the birds have increased their number many times. During that period we have cut "ripe" timber to make way for the new seedlings, which one day will represent thousands of dollars worth of beautiful wood in a world badly in need of it.

The whole crop may not be harvested during my lifetime but in the meanwhile we have back the singular, almost tropical beauty of the Ohio hardwood forests, an increase in game even to deer and grouse, and no water any longer runs off the forest floor. Even the old gullies have healed over as the run-off water from the fields above has been totally checked.

The only inconvenience arising from the control of land and water has been the appearance here and there near the bases of our bigger hill areas, sometimes as large as an acre or two in extent, of what might be described as seepage spots or "wet weather" springs. This inconvenience is small in comparison with the restoration of the springs over all the farm, and we have in most cases managed to correct the overabundant moisture merely by continuously plowing in heavy sods on these spots and greatly increasing the organic content.

(*Continued on page* 150)

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FARM BOOKS

(*Continued from page* 18)

grass in his rotations doesn't need the first two chapters of this book to convince him that he is taking a wise step. The man who is averse to more grass on his farm isn't going to bother reading them, or if he does, he isn't going to be convinced by their line of argument. All of which is merely another way of saying that the first two chapters of Hi Staten's book are simply a restatement of all the dire warnings that have been published in years past of what will happen to the individual and the country as a whole if we don't get more grass into our agriculture and the riches that can and will be ours if we do.

After those first two chapters, though, there follows some of the finest and most complete material on grasses that has ever been put between the covers of a book designed for popular consumption. Staten, Professor of Agronomy at Oklahoma A. and M. College, covers just about everything the work-a-day farmer wants to know about grass and how to use it to best advantage. Every point is covered, from regrassing abandoned land to grass breeding and producing and harvesting seed.

This material is all original and its manner of presentation is direct and specific. An example of the author's original thinking on grassland matters is his insistance on the impossibility of attempting to set up scales of palatibility preference of livestock for various species of competing forages. He not only sets forth specific examples to confirm his position but suggests the term "utility" as being a better indicator of the value of a grass for pasturage. So-called palatability studies, he argues, demonstrate not the palatability of a species but rather the "abundance of growth and the palatability of the stage."

The chapter on grass roots has some unusual and helpful suggestions on the use of knowledge of a plant's growing habits to control weeds and noxious growth and to stimulate the growth of useful species.

Specific recommendations on grasses for use in all parts of the United States are contained in five chapters which treat of the distinct pasture regions throughout the country.

Soil Microbiology, *by Selman A. Waksman. John Wiley and Sons, Inc., New York, $6.00.*

The soil has been likened to the rumen of a cow into which we pour material which the bacteria convert into usable feeds. The soil, too, has its microscopic life which convert plant residues into humus, which fix nitrogen from the air into usable plant foods, convert soil minerals into soluble plant foods and, to make the chain complete, retrieve from the plant wastes these same minerals and return them to the soil. Without these unseen living things we could not farm, but there are also microscopic villains. Disease germs which attack plants and animals, such as the spores of anthrax or the mosaic virus of wheat, are also soil dwellers.

Since man discovered the microscope, scientists have become explorers in this world. Some of their findings have been of immediate practical benefit to farmers, such as the isolation of the legume innoculants which make it possible for us to grow better legumes and fix more nitrogen in our soils, or the discovery of the wonder drugs which have helped us fight diseases in our animals and, more recently, given us an addition to our feeds which is putting weight on our swine and poultry at a more economical rate.

A new look into this strange world has been given us by Selman Waksman, the great American scientist who discovered streptomycin, in this, his third general book on the subject. Though some of the chemistry will be beyond the average reader, a great deal of value and interest may be gleaned from this scholarly book.

Field Crop Insects, *by F. A. Fenton. The Macmillan Company, New York, $5.75.*

Usually when a farmer or gardner picks up a book to try to

PERHAPS YOU, TOO, CAN GET A 70-lb. Heavier Calf* for a Lot Less Cost

NURSING CHOW, Purina's New Milk Replacer, Makes a Big Difference . . .

*Most dairymen's Holstein calves, according to Morrison's "Feeds and Feeding," weigh 250 lbs. at 4 months. Compare that with 320 lbs.—the average 4-month weight of Holstein heifers fed Nursing Chow and Calf Startena on the Purina Research Farm during 1952. (Bull and heifer calves together averaged 326 lbs.)

Take a look at the calf on the left above. She represents the average weight of her breed at 4 months. On the right is a Purina-fed calf at the same age. Which will make the better cow?

NOW LET'S CONSIDER COSTS

If the calf on the left got an "average" ration, she consumed:

Whole milk	1770 lbs. at 5¢	$86.00
Grain	200 lbs. at 4¢	8.00
Hay	150 lbs. at 1¢	1.50
	TOTAL	$95.50

Here's the ration for the calf on the right:

Purina Nursing Chow	25 lbs.	$ 5.50
Calf Startena	450 lbs.	31.50
Hay	125 lbs.	1.25
	TOTAL	$38.25

Prices in these rations are estimates of nationwide averages and may vary up or down in your community. The relative cost of these two rations, however, will remain fairly constant.

Look at the cost of Nursing Chow and Startena together. Less than half the average cost of the whole milk they replace. And besides that, antibiotics in Nursing Chow help keep down nutritional scours, our research has shown.

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get some helpful information on a particular insect that is attacking his crop and the best ways of controlling it, he gets himself into even more of a quandary. The volume he opens may be an excellent treatise on insects, but the whole trouble is that it's too good. In the great majority of cases it turns out to be a book written by an entomologist for students of entomology.

Such is not the case with Professor Fenton's handy and timely volume. The book was written, the author states in his preface, from subject matter taught in a course on field crop insects for students in agriculture. As such it assumes very little on the part of the reader so far as background material is concerned and in clear and simple terms explains the most essential things a man needs to know to do a good job of protecting his crops from insect depradations.

Happily, Fenton, who is Professor of Entomology at Oklahoma A. and M. College, leaves the chemistry of insecticides strictly alone and gives a concise non-technical statement on the control of each pest of which he treats.

Mechanical, cultural and biological insect controls are given careful attention as well as the insecticides.

By far the greater part of the book, of course, is concerned with those insects that are of economic importance in field crops and stored grains, but there are enough references to the insects that prey on vegetables and fruits to make it a valuable guide to all who in any way find themselves pitted against the insect hordes.

The Farm Book Store

The Editors of the Farm Quarterly, after a careful selection of current agricultural books, recommend the following to our readers.

SOIL AND CROPS

Vegetable Growing—*by J. S. Shoemaker* $6.00
For truck farming or garden information this book is hard to beat.

Grasses and Grassland Farming—*by Hi W. Staten* $5.00
One of the best books on practical grass farming.

Principles of Field Crop Production—*by Martin & Leonard* $6.00
A new book covering the growing of every major farm crop.

Forages—*edited by Hughes, Heath, & Metcalfe* $6.75
52 experts produce a book that covers grass farming for the nation.

Field Crop Insects—*by F. A. Fenton* $5.75
How to battle the insects which destroy our field and forage crops.

Colorstrip Plant Testkit $4.00
A compact, accurate tissue testing kit that can be carried in the pocket. Tells whether your crops are getting enough nitrogen, potassium and phosphorus to make good growth and produce high yields. Complete instructions come with the kit.

Soils and Fertilizers—*by Firman E. Bear* $4.50
An understandable book on the complex subject of fertility.

Using and Managing Soils—*by A. F. Gustafson* $3.20
Fertility, rotation, drainage, erosion tillage are covered.

Hunger Signs In Crops—*A Symposium* $4.50
How to diagnose fertility needs from the plants themselves.

Production of Field Crops—*by Hutcheson, Wolf & Kipps* $5.00
A new edition makes this the latest work on American field crops.

Irrigated Soils—*by Thorne and Peterson* $5.00
The practice of irrigation and the management of irrigated soils.

Complete Herb Grower's Kit—*by Rosella Mathieu* $3.50
Growing, blending and marketing herbs; includes seeds and samples.

Cotton—*by Floyd Barnhart* $3.75
All aspects of cotton farming written for the farmer.

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LIVESTOCK

The Hog Annual—*by the editors of Farm Quarterly* $5.00
The latest articles and breeders' lists available to date.

A Veterinary Handbook for Cattlemen—*by J. W. Bailey* $5.00
For that emergency when you can't reach the Veterinarian.

Pork Production—*by W. W. Smith* $5.50
A revised edition of this excellent book for the hog farmer.

Livestock Health Encyclopedia—*by Rudolph Seiden* $7.50
An alphabetical reference book on animal diseases and sanitation.

Restraint of Animals—*by J. R. Leahy & P. Barrow* $3.50
Line drawings and text tell how to hold animals for treatment.

Feeds and Feeding (21st ed.)—*by F. B. Morrison* $7.00
The authoritative book on livestock and poultry feeding.

Dairy Science (2nd ed.)—*by W. E. Petersen* $6.00
A new edition of one of the best and most complete books on dairying.

Poultry Handbook—*by Rudolph Seiden* $5.95
An encyclopedia of poultry feeding, management, and disease.

Beef Cattle—*by Roscoe R. Snapp* $6.50
A carefully revised edition of this excellent book on beef production.

Successful Poultry Management—*by M. A. Jull* $5.00
The second edition of this practical book on poultry.

FARM MANAGEMENT

Soil Microbiology—*by Selman A. Waksman* $6.00
A scholarly book on the microscopic life of the soil.

Soil Development—*by E. H. Faulkner* $3.00
The author of *Plowman's Folly* starts another controversy.

Farmer's Tax Handbook—*by J. K. Lasser* $4.95
A guide for saving taxes on farm income.

Farm Records and Accounts—*by J. N. Efferson* $3.50
A practical book on keeping and using farm records.

A Practical Guide for the Beginning Farmer—*by Herbert Jacobs* $3.00
A book to give you an intelligent start in farming.

Modern Farm Management—*by Andrew Boss & G. A. Pond* $6.00
The principles and application of management to the farm.

Farm Work Simplification—*by L. M. Vaughn & L. S. Hardin* $2.96
The application of efficiency studies to farm work.

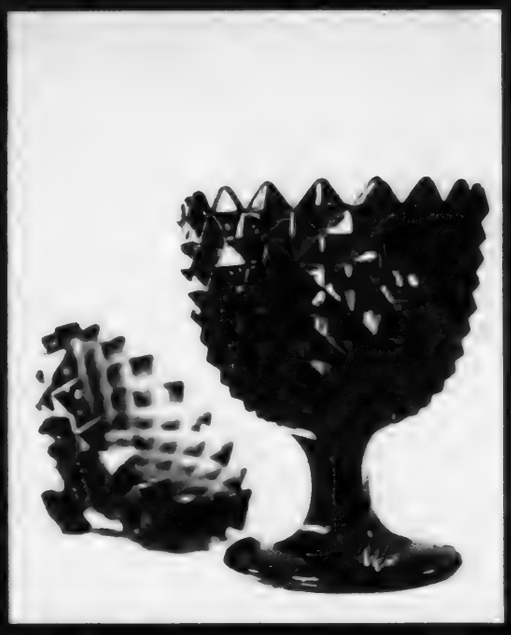
Success on the Small Farm—*by Haydn S. Pearson* $4.25
Subject—how to net $3,000 a year on 10 to 12 acres.

The Farmer's Handbook—*by John M. White* $4.95
Easy reference book on crops, livestock, and farm problems.

Shopwork on the Farm—*by M. M. Jones* $4.50
An excellent reference and how-to-do-it book for the shop.

The New Joy of Cooking—*by Rombauer and Becker* $3.95
This will be the most used book in the farm home.

THE FARM HOME



If you are lucky you may find valuable old American glass at country auctions (see page 82)

In the Spring a livelier iris changes on the burnish'd dove;
In the Spring a young man's fancy lightly turns to thoughts of love.

ALFRED TENNYSON

SHIVAREE

Many a young couple's smiles fade when they discover their friends are planning an old-fashioned belling.

THE BRIEF CEREMONY in the Featheroff parlor was over and Alice Featheroff was now Mrs. Dan Hoffman. As she sat beside her husband at the wedding dinner she looked across the table at her cousin Abel, who could laugh and eat at the same time. "How can he act like that?" she thought. "This is my wedding day and it's not right to laugh about it."

To Alice marriage would be a career—she would keep a good house and take care of Dan and have children. Most of all she wanted children. When she thought of children she blushed, for she knew little about the mysterious processes by which children were conceived and born. Her blushes deepened, for unbidden, and out of nowhere, came the thought that tonight in Philadelphia she would be alone with Dan.

"It can't be bad now," she told herself. "We're married." But the thought of her wedding night filled her with a not unpleasant mixture of fear and anticipation.

She was relieved when Dan pushed back his chair and with a great show of casualness announced. "I think I'll go hitch up. It's going to be a long trip to Philadelphia."

With her chattering helpers Alice went to her room to dress for the journey. In a few minutes Dan came back from the barn, clomped upstairs and knocked timidly on Alice's door.

"You don't need to hurry, Alice," he said. "We don't go to Philadelphia today. We get a belling tonight—somebody got a wheel off our buggy."

Stoically Alice unpacked her hand bag.

By evening the grapevine had carried the news of the belling to every farmstead around Emaus—there would be a gathering at Groot's grocery store on the Bath road—the bride and groom were holed up at old Gus Featheroff's—one of the Hinkle boys had taken a wheel off their buggy and it was certain that no one would lend them a rig.

Soon after dark a half dozen boys wandered into Groot's store and sat down around the pot-bellied stove. Then some young men, a few with their girls, showed up, and finally there came a sprinkling of older people. They carried an amazing variety of gadgets designed to make noise—horns, pots and pans, gongs, cymbals, and bells—cow bells, sheep bells, sleigh bells. The Hinkle brothers had taken down the 150 lb. dinner bell from the milk house and carried it on a pole across their shoulders. There were a few of the lustier instruments from the Bath Silver Cornet Band.

Soon the store was crowded. Mrs. Groot took up a strategic position where she could keep one eye on the small boys and the other on the open cracker barrel. The young bucks pinched the girls and the small boys tried out their bells and horns on each other. In the bedlam and confusion the flames danced in

(*Continued on page* 141)

By Marie Armstrong Essipoff

FREEZER HERESIES

It's fun to experiment with freezing. You may discover new foods you can freeze.

We do not get much chance to pioneer in this day and age. But the field is still wide open for those of us who are lucky enough to own a freezer—any sort of a freezer.

I started my freezing career using part of the ice cube compartment. Finding out how useful this was led me to rent a box, or locker, in a big place where they did everything for you except supply the money to buy the food.

A little of that and I realized that I had to have, must have, just got to have, a food freezer of my own. So I bought it and all the books that told me all there was to know about freezing foods of all kinds, and started in to do just what I was told to do. In about four months I was in open rebellion.

I had found out several things.

I found out, for instance, that somebody had at some previous time put down a set of rules, and that nobody had varied from these rules by so much as an ounce of frost since they were first drawn up and handed to us as the Freezing Commandments. Moreover, the instruction books issued with various makes of food freezers, and such later publications, books, and articles as I have read, still adhere to these identical rules which to my certain knowledge were instituted over six years ago, at least.

ASPARAGUS, LIMP AND LEACHED, has been blanched to death. After it is frozen, thawed, and cooked again, it will be as limber as spaghetti.

The Books say, "'All vegetables must be blanched. If you do not, things do not keep. Flavor is lost. Terrible things happen to people who do not blanch, blanch, and blanch."

The Books also say, "You can successfully freeze This, That, and The Other, but These and Those cannot be frozen. Terrible things happen to people who try to freeze These and Those."

And The Books say, "The Cardinal Commandment of using a freezer is: Once something is unfrozen, it can never be frozen again."

I had my doubts. For a time I considered it my mission to prove everything in The Books wrong. With six years of work under my belt now—and loving, appreciative work it was, too—I have come up with the following convictions:

1. You have to learn the rules before you can start to break them.

2 If The Book says so, it ain't necessarily so. Find out for yourself.

3. The field is wide open. Walk right in! If I have proven nothing else, I feel I have demonstrated that as far as using a food freezer goes, we are still in the pioneer stage.

In the beginning of your freezing career, blanch everything the book says. Then begin to experiment. My experimenting started when, after having watched vegetables grow limp and often tasteless from blanching according to the book, I began to wonder whether this thing was not being just a wee bit overdone. Then one day I had the chance to buy almost a bushel of lima beans in the pod for a few pennies. They were right on the verge of spoiling. Even another day would kill them dead. I dug in and depodded like mad, and started to blanch. Things ganged up on me. Time ran short. I finally said, "To heck with this blanching! These beans go in without it or they spoil right here and now."

What happened? I carefully marked all boxes which I had not blanched. And frankly, we liked the unblanched ones just a little better than the ones I had given the works according to The Book.

And this is how narrow your margin can be as when and when not to blanch. Those particular beans were good blanched, and better unblanched. But a few days later I tried another lot of beans and did not blanch them and they were tough as rubber beans when we tried to eat them. Why? Further experiments along the line of blanching or not convinced me that the breed of the bean or whatever vegetable is in question, has almost everything to do with it.

Most catalogs of fruit and vegetables today list certain varieties as "Good Freezers." I am convinced that some kinds can be frozen successfully with no blanching whatsoever. Others cannot. Therefore, if you come face to face with a particularly large amount of any kind of vegetable to process for your freezer, I suggest that you take a day ahead and blanch one box or bagful, and package another without blanching. Then try some of both. Overnight freezing generally will tell the story. This is practical, of course, only with large amounts, or if you have your own garden and are trying out varieties and keeping track. Since one of the great blessings of owning a food freezer is to grab at chances to freeze fruits or vegetables when they are ripe it is worth while to do a little experimenting in this way.

Freezer to the Rescue

Another summer we had an avalanche of eggplant. We like eggplant, but after all you cannot use it as prolifically as you can use tomatoes. Happily the freezer came to the rescue. The first lot I duly peeled, sliced and blanched. With the second lot I omitted the peeling, but carried through on the slicing and blanching. The third, fourth, and so on lots I no longer peeled, no longer blanched. Today we still have some left from that orgy of eggplant and only the other day I used two boxes of slices making that wonderful and glamourously named Oriental meal-in-a-dish, "The Imam Fainted with Delight When He Tasted of This." It is the freezer owner's delight since almost everything comes out of a freezer—the onions, green peppers, lamb or young goat, and tomatoes. At present we are still using unblanched eggplant in boxes marked 1947. The flavor is still good but the texture has gotten a little rubbery.

Corn is another vegetable which many people do not know how to prepare, freeze and cook properly. It is the most delicate

of vegetables and should be picked from the stalk about 20 or 30 minutes before it is to be served, or prepared for freezing. If you intend to freeze corn, husk only a few ears at a time, wrap well or package in plastic bags, freeze quickly. I prefer not to blanch corn despite what The Books say, because I think it overcooks that way.

Snapbeans and waxbeans are nice to take from your own garden, too, because one so seldom gets them completely fresh in the market. A single night's layover is enough to wilt them somewhat. The books say to blanch them about 2 minutes, but I say try them without blanching as well.

After my six years' experience I am equally convinced of this, too—The Books call for too much blanching even when blanching is necessary. This is the time to say that after first trying all vegetables blanched according to The Books, afterwards cut the blanching time recommended for any and all vegetables from one third to one half. I found that asparagus, for instance, when blanched from 3 to 5 minutes as recommended was too much cooked when put through the usual process for the table. The stuff was limp and tasteless. I cut the blanching time exactly in half and got a better product. I do think that asparagus needs some blanching, although two of my friends-by-correspondence tell me that they like it better unblanched. There, again, it may be because they are in a different part of the country and are using a local variety not available to me.

Also, if you must make a choice between putting something in the freezer unblanched or not at all, by all means put it in, and let the blanching go gallagher. And if this be treason, make the most of it because I have worked by these rules for several years now and I have no regrets.

Some "Unfreezables" May Be Frozen

If you go by The Books, you know that you can freeze peas, carrots, beans, asparagus, beets, and so forth. Any Book, or the instructions that come with your freezer, will give you a list.

But The Book views with suspicion the freezing of celery and lettuce, shudders away from freezing onions entirely, and shies away from freezing peppers and mushrooms. Yet for years I have kept a culinary backlog in my freezer of dozens of plastic bags of chopped onions, chopped celery, green peppers cut in strips, and bags and bags of mushrooms of all sizes and conditions, all ready for instant use—and all without benefit of blanching.

I buy onions when they are cheapest, in the fall, fifty pounds at a time, and over a period of from four to six sittings and weeping, I peel and chop and bag them in amounts of from a half cup to a cup each. These plastic bags in turn go inside either a tightly closed plastic container, a wrapping of aluminum foil or another and larger plastic bag.

TEARS NEED BE SHED but once for the whole year when onions are prepared in quantity. They don't smell up the freezer if they're packed in double bags.

Even when frozen, onions do give off some odor in a freezer. I discovered this once when in a terrible hurry I put about 10 pounds of freshly chopped and bagged onions next to a loosely closed box of ice cream which made us eat onion ice cream at least once. This is not anything to stop or baffle you because the odor quickly disappears in the freezer and if you thoughtfully place one of those charcoal desmellers inside it goes quicker than that.

But it is wise to give double packaging to chopped onions. Once frozen, and the volatizing over, you may be casual about closing the outer bag. Indeed, I often take out the smaller bags and discard the outer one altogether if I need freezer space and stick the small bags just anywhere.

If you use onions much in cooking, this method of always having the right amount ready instantly is a lifesaver. In a hurry you can toss a lump of frozen onions into a dish and defrost as you cook!

Mushrooms are expensive. Yet I have them by the bagfuls and use them almost every day. This because, as I did yesterday, I buy them when the market is flooded and they must be marked down to get them sold before they start to get gooky. Yesterday I paid only 33 cents a pound and bought 5 pounds. Today they are all bagged and frozen.

The Book lists them as "poor freezers" and at least two of The Books give difficult instructions for preparing them to freeze, including cooking via the frying process. Mushrooms really are easy to handle. In the first place, do not peel them unless they are partly spoiled, which can happen, but a little soft part doesn't disqualify a mushroom. Just cut off and go on. Much of the flavor lies in the peeling and ever since the time in Europe when I saw mushroom peelings canned for sale, I decided that they must be worth something. And please do not wash them before freezing, unless—as rarely happens—they are terribly dirty. Just take a tiny slice from the bottom of the stem, package, and freeze. If they must be washed, do so after you take them out of the freezer and before using.

Here is a tip. Mushrooms may be sliced beautifully paper thin, if you do so when they are just partly defrosted. With all frozen foods there is a magic moment when, partly thawed, anything can be cut or sliced to perfection.

No matter what anybody tells you, do not blanch celery. Just slice and freeze. As for peppers, if you must blanch do so for half the recommended time. Personally I prefer them unblanched.

Lettuce, too, should be frozen without blanching. It is not a perfect freezer and has limitations. When frozen it must be used almost as it comes from the freezer—still a little frosty. In a pinch it may be used in salads, but is better shredded and used in some dish such as Mexican eggs. Even here I concede that a crisp head from the market is better, but I am glad enough for my frozen lettuce when I do not have fresh on hand.

Select good heads, trim and wash and shake dry—never package them wet! Put them in plastic bags, first lightly wrapping each head in cellophane to make removing them easier.

I Freeze Bananas

Bananas, tomatoes and cucumbers have generally been regarded as unfreezable in their natural state — tomatoes collapse when thawed, cucumbers go soft, and bananas get mushy, discolored and flat. When pureed, however, they freeze very

BLANCHING IS A BORE when you are swamped with a whole crop of beans, ripe and ready for the freezer. Most books recommend about twice as much blanching as is necessary and different varieties require different lengths of time in the boiling water. A trial run with your own vegetables will help you make your own rules for the job. If you suck the air out of the plastic bag, then seal it quickly, the quality and keeping ability will be improved. The less air in the package, the better the freeze.

well and, thus, are available out of season for all sorts of dishes.

Cucumbers have a way of suddenly flooding the market or your garden. When this time arrives, peel for each cooking one dozen cucumbers, cut lengthwise, remove the seeds and slice thinly. Sprinkle with 2 teaspoons of salt. Put into a heavy saucepan and add boiling water so that there is about one half inch on the bottom. Let come to a simmering boil, then cook until tender when tested with a fork. Drain, force through a colander or Foley mill, and package. As a vegetable it can be used just as it is, heated, with butter, salt and pepper, and a touch of prepared horseradish. The puree may also be used in dressing for tomato or other salads, cheese dressing, sauce for meat or fish, and even in soup.

When tomatoes are plentiful they are usually so plentiful that one is staggered by them. In the old days this meant endless canning, gallons of hot water, handling hot jars, tops, and infinite processing. The modern way is to steam them up lightly, not overcooking, package and freeze. Because of the juice, however, this does take considerable room in any freezer, so it may be preferable to make tomato puree instead.

Mash 8 pounds of unpeeled quartered tomatoes. Add, finely chopped, four green peppers, 6 celery stalks, 2 onions, and 2 cloves of garlic and 1 teaspoon oregano if you like. Simmer all together a full hour, then put through a Foley Food Mill or colander to remove the skins. Put the pulp in a double boiler and again simmer until this amount is reduced to the desired consistency. This recipe makes three pints, approximately, and may be used in spaghetti sauce, as tomato juice, in aspics, soups and fish sauce.

(*Continued on page* 123)

Country Auction

ABOVE ARE two "finds" from country auctions. The South Jersey milk pan is of heavy aquamarine glass with a hollow rim. Its expanse of surface made it easy to skim off the cream. The pitcher is blown glass and was made in Pittsburgh about 1860. On "The Farm Home" cover, page 75, a variety of old American glass pieces are illustrated: (1) is a picturesque flask with a bust of General Washington molded into it; (2) is a sapphire blue, diamond thumb-print compote, made in Pittsburgh; (3) shows a number of blown and pressed glass items; (4) is a "violin" flask. All of this old American glass is from the Howe Collection, through the courtesy of the Cincinnati Art Museum.

Ike Newman was feeling his years of work on the farm but he had enough salted away, he thought, to do him. He'd sell out and go to California where life was easy; he'd have an auction and let everything go, lock, stock, and barrel.

Ike had lived for 60 years on the farm his father left him. The attic, sheds and lofts were stuffed with a lifetime collection of personals which only an auction could bring into the light of day. Ike's machinery and livestock were above average and his wife had furnished their home with solid pieces. It would be a good auction.

Ike decided to hold his sale in late June. His neighbors would be glad to have an excuse to take a day off from cultivating corn and making hay to come to the sale. Ike drove into Plainfield to have a talk with Colonel Woodrow Boone, reputed to be the best auctioneer in the county. The Colonel asked 5% for selling the farm and a flat 2½% on livestock, machinery and household goods. Ike made a quick calculation and decided that Colonel Boone was making too much money for one day's work.

But Colonel Boone refused to haggle. He pointed out that 5% on the farm was the regular commission charged by realtors. The 2½% on the chattels and household goods was low, he said. "Up in New England they're getting as high as 10%." Ike reluctantly gave him the job and they set June 26 for the sale.

A few days later Colonel Boone drove out to Ike's place to "write up" the sale. He listed the household goods, farm tools and livestock, and wrote a glowing description of the farm and buildings. He carefully examined everything that would go on sale, noted its condition, and made a mental note of its probable value.

"HEREZA GONG BRUSH without a bristle missing," chants the auctioneer, above. The crowd has come for bargains and doesn't consider this one. In contrast to the old-time all male auction, left, today's gathering is a spring social event that brings out the whole family.

He picked up bits of history about the older pieces of furniture which he would recite at the sale. He had Ike and his wife arrange and classify everything, packaging small items in lots, each with a "come on" article to tempt the buyer looking for concealed bargains. Bills were printed and an advertisement appeared in the *Plainville Courier*. The bills were tacked up at vantage points around the county—in the post office, hardware stores, feed dealers, on fence posts at crossroads, and on an old tree near the covered bridge across Walnut Creek. For fifty years this old elm had been used as a billboard for sale bills and election posters and farmers always stopped there to read them. Ike was charged for the printing, but the distribution was part of the service offered by the auctioneer.

In addition to the listing, the bill gave the information that the sale would start at 9:30 A. M., the terms would be cash on the day of the sale, and the Ladies Aid Society of the First Baptist Church would serve lunch.

The day of the sale dawned cool and clear, one of those June days the poets like to write about. Long before the time for Colonel Boone to open the sale, cars lined the lane leading up to Ike's house. The Baptist ladies had taken over the milk house stoop and were already selling coffee.

Everybody expected to pick up something for less than it was worth, and Colonel Boone knew that Ike and his wife expected him to sell it for more than it ought to bring.

Colonel Boone was there, too, directing his assistants in last minute rearranging of the household goods on the lawn. In singles and groups the men examined the machinery and livestock; the women poked into boxes and opened drawers among the household goods on the lawn. One prospective buyer for Ike's tractor

(*Continued on page* 117)

By Grant Cannon

WEEDS YOU CAN EAT

Greens announce that Spring is with us - - cooked with a bit of bacon they are the first and most delicious vegetable of the year.

WHEN your worries disappear — as though a mist had been lifted from the brain—and the warm air and sparkling sunshine show you the fallacy of work and the desirability of lying down on the new grass for a spell—a mess of greens is in order to celebrate the arrival of Spring. The greens will be there, for before men have discovered in their blood—quite apart from their calenders—that Spring has come, the plants have known it for some time and have sent up their tenderest, most succulent shoots and leaves and stalks.

Even before the snows have left the ground, the shiny green leaves of the winter cress have spread out like rays from a central crown and are ready to be gathered, cooked in two or three waters —for they are sometimes called *bitter cress,* and rightly so—and eaten as the first green food from the land. Dandelions and the common chickweed are ready for the pot almost as soon and together they make a good combination: the mild spinach-tasting chickweed blending with the more bitter dandelion. And then come a whole procession of the wild weeds that can be eaten, the marsh marigold and shepherd's purse, fireweed, penny cress, poke, and a whole host of the dock family —narrow dock, bitter dock, spinach dock, curled dock—and the leaves of the early blue violet and wake robin, and plants with such inedible names as skunk cabbage and bellwort.

In May and Summer come so many wild greens—plants like corn salad, stinging nettle, wild lettuce, ostrich fern and sow thistle, pepper grass, touch-me-not, lamb's quarters, scarlet pimpernel, and milk weed—that it is a wonder we bother to plant a garden at all. Being human and contrary, we chop these weeds out of our gardens and hunt for them in the fence-row and the wood lot and down by the creek.

One might even take a measure of revenge when gathering greens by eating the roots of the bothersome crab grass (which can be dried, ground, and used as flour) or the leaves of the wild onion or scotch thistle or stinging nettle; but green gathering is not a matter of spite or vengeance —the true lover of potherbs eats them because they are the most welcome food in the world at this time of the year. Once you have eaten a mess of greens prepared by a master cook such as Hattie Givens, you'll never let a Spring go by without thinning your blood with greens. They don't really thin the blood, of course. Quite the contrary they bring to the blood the minerals and nourishment which the deep-rooted weeds have found in the lower soils. Mainly they have notified the inner man that it is Spring and he feels lighter, more buoyant—perhaps even thinner.

Hattie Givens is a large friendly woman who comes by her knowledge of greens and how to cook them from her ancestors who learned the economy of potherbs in the old South. She is the kind of cook who can feed you forever on greens and a little smoked and salted hog jowl without tiring you. In the Spring she often puts on her wide-brimmed, black, summer hat and takes her nephew Rickie by the hand and wanders through the vacant lots and the fields and along the banks of the Licking River near her home in Kentucky hunting out black mustard and narrow dock (pronounced as though it were one word, narradock), and the other weeds which go into a mess of greens. Rickie industriously gathers blades of grass and leaves of trees and any other growing things within reach. Once when she asked him, "Rickie, what kind of greens you gathering?", he gave her a one word answer, "Meat." Sometimes she visits a friend's farm for a green hunt. "This is Givens," she will say on the phone, "I have a little piece of jowl I was intending to bring out sometime you are home."

She has an enthusiastic though inaccurate memory as to birthdays and often sends a card or brings a small present to a startled child in mid-year and has been known to celebrate more than one birthday for the same child during the same year. She is as generous with her herb lore as she is with her birthday wishes. "In the first of Spring, dandelion, narradock, and black mustard comes the earliest and makes a good combination," she said as she sat on a camp stool for which she was dangerously large, culling through a basket of greens throwing out some plants which were too tough and some poisonous peach leaves and grass stems (Rickie's contributions). "You mix them about even for each one. Later I like to get a

A MESS OF GREENS, narrow dock, shepherd's purse, and wild lettuce are gathered by Mrs. Givens, right, in the spring when they are tender.

mess of dandelions, narradock, shepherd's sprout, black mustard, and poke together and, if I can find water cress, I put in a very small amount because it's so bitter. My, my, you just can't eat much of it. And if you like greens with a little extra flavor, like I do, you put in a little piece of red pod pepper.

"When you go to cooking the greens," Mrs. Givens continued in her pleasant soft voice as she stopped Rickie from dismembering a poke plant, "remember that the ones that are a little bitter, like poke, dandelion, wild onion, winter cress, skunk cabbage, or milk weed, should be washed good and then put in a pan and covered with boiling water to draw out the bitter.

(*Continued on page* 114)

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BLOAT

(*Continued from page* 65)

victims of bloat. Secondly, dry feed seems to inhibit or prevent bloat. Dr. H. H. Cole of the University of California explains this with his theory that the dry scratchy material tickles the paunch wall and causes more belching. This theory would also seem to justify the feeding of hay in racks to stock on pasture, a practice that many follow with success.

Taking Pasture to the Stock

More recently the feeding of freshly cut forage in dry lot has been advocated as a bloat preventive. William Phelps of Granada, Minnesota, is a cattle feeder who tried this as a last resort and found that it works.

"During the summer of 1951 I pastured 271 head of calves," says Phelps. "Had them on alfalfa-ladino-brome grass pastures. The first two weeks they were on the pasture continually with no sign of bloat. Then I lost four steers the next week and during the following six weeks, though I tried several different methods of control, I had no luck and my death loss ran up to seven and a half per cent.

"We were baling hay at this time, so I started chopping dry hay and hauling it to them. I chopped it greener every day until finally we were mowing and chopping the same day and the steers were showing no signs of bloat. They were doing better than they had done on pasture, too.

"This past summer I tried the same thing on 100 calves and had good results. I found I could feed immature alfalfa and ladino with no trouble whatever if I mixed a few pounds of ground ear corn with it. I not only eliminated bloat but I found that I needed only half the pasture acreage I had formerly used to handle the same number of cattle.

"I must admit I did have one sad experience, though. That was when I tried mixing cracked barley with the chopped green alfalfa. The mixture seemed to be bad for the calves and after trying it once I gave it up."

M. W. Martin and sons, of Hancock, Iowa, were less fortunate in their experience with this system. The Martins feed about 200 head of cattle every year and in the fall of '51 they brought a bunch in from Montana. Prices being what they were late last spring they decided to keep them through the summer, but having had trouble with bloat before they resolved to take every precaution against it this time. So they tried cutting the forage and feeding in dry lot.

"We were thrown completely off guard," Martin recalls. "We didn't expect bloat and didn't watch for it very carefully and the first thing we knew we had some losses.

"Forage that was wilted before feeding seemed to produce no bloat; but if we cut it and fed it without wilting we had

(*Continued on page* 90)

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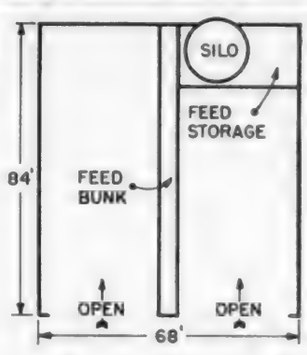

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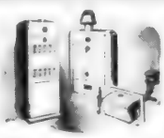

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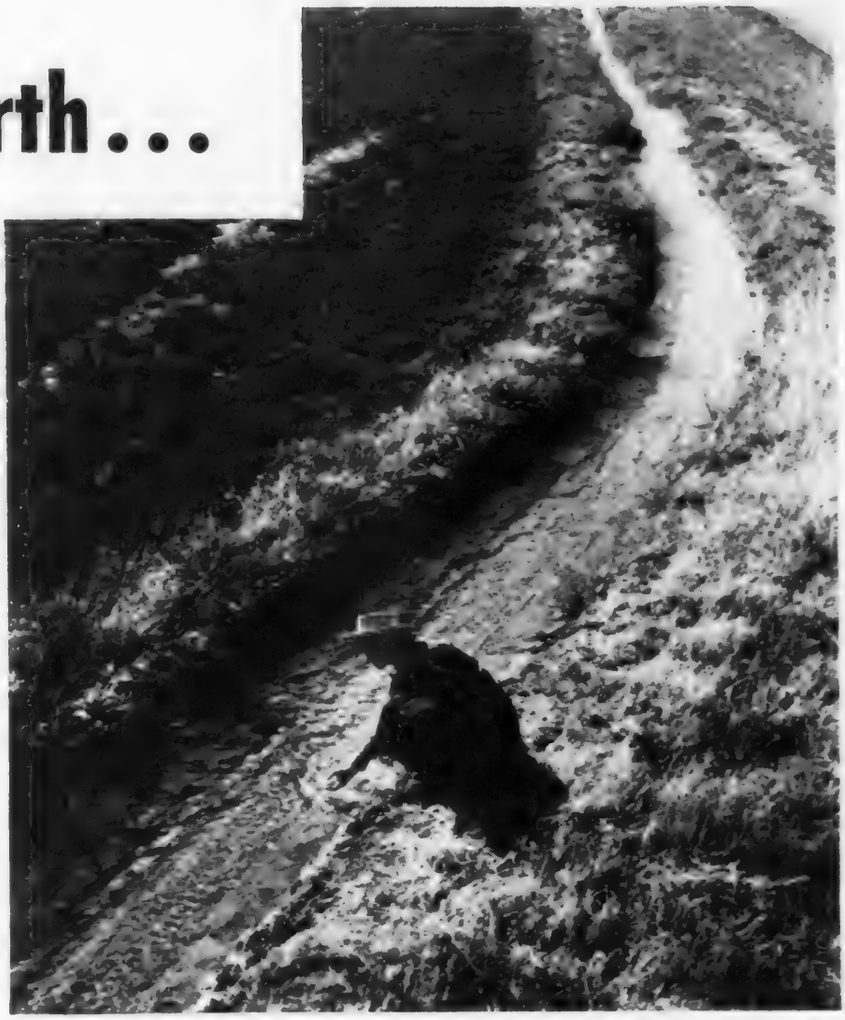

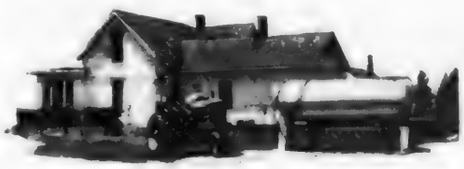

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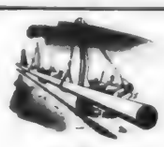
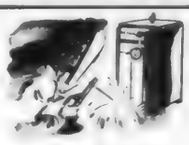


Line Pipe and Oil-Well Casing



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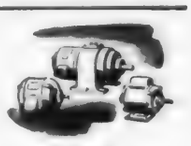

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The PROTO Line Includes Wrenches of All Types, Pliers, Screwdrivers, Punches, Chisels, Sockets & Handles, and Many Others.

One reason why PROTO tools are professional tools is that they are made from superior PROTO-specified alloy steels. Known as PROTOLOY, these special alloy steels provide great strength, hardness, toughness—and extra long life. Scientific heat treatment, advanced designs, accurate manufacture, a meaningful guarantee and completeness of line are more reasons why experts prefer PROTO. For truly *professional* tools, see your PROTO dealer. Send 10¢ for 68-page catalog to

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PROTO TOOLS
LOS ANGELES

Eastern Factory—Jamestown, N.Y.

ONE good bloat preventive—a fence, to keep cows out of pasture while the dew is still on it.

BLOAT

(*Continued from page* 86)

trouble. Another thing we noticed was that bloat varied with the feed cut from different fields. Those that had a lesser legume content seemed to be less dangerous."

Bloat is not a lingering disease. As Martin found, death usually occured anywhere from five to twenty minutes after the first symptoms and before a veterinarian could be called.

"We saved about half the bloated animals by sticking them," says Martin, but we still lost eight head during the course of the summer.

"I've always tried to balance the grass and legumes in my meadows about 50-50," the Iowan continues, "but in the future I'm not going to have more than forty percent legumes and possibly only one-third legumes and two-thirds grasses."

So much for pasture management to prevent and control attacks of bloat. But supposing, like Phelps and the Martins, you've taken every precaution you ever heard of and still come up with a bloated animal. What to do?

Treatment

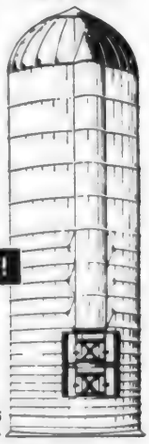
Bloat is nothing to take lightly, so the recommendation to call a Veterinarian is more than a matter of ethics. During the last two or three years a number of preparations have been introduced that in the hands of experienced practitioners may be effective. Stiglyn is one of these, an alkaloid that is given as an injection for treating bloat caused by paralysis of the rumen. Then there is the product known as Tympanol that contains the material methyl silicone, a drug that breaks up the gas bubbles and is a valuable aid in cases of foamy bloat. Rumene is another drug that has been used with some success in treating foamy bloat. It can be administered either by means of a stomach tube or by injection through the walls of the rumen.

Farm security for the YEARS AHEAD

Invest in a Marietta SILO

A Marietta silo can be your protection against changing farm price levels. Now, while prices of farm products are HIGH, is the time to invest into income-producing, work-saving, lifetime equipment.

You'll be surprised at how reasonably you can own a famous MARIETTA silo. Easy financing available!



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BLUE RIBBON *Emulsion*

IN THE SELF-FEEDING BOX

This energized feed supplement, with its condensed buttermilk base, is a proven money-maker for poultry raisers. It gives chicks and poults the milk vitamins, the extra minerals, the extra proteins needed for resistance to disease, and fast, thrifty growth. Excellent also for layers and broilers.

BLUE RIBBON *Condensed Whey*

IN SELF-FEEDING BOX

Rich in milk vitamins and other important nutrients, Blue Ribbon Condensed Whey helps poultry and turkeys get more value out of the mash and grain they eat. It whets the birds' appetites, conditions their digestive systems for fast growth and maximum production.

- *Ask for Blue Ribbon at leading dealers*

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Plants throughout the Central West States

Since it is very difficult to diagnose the real cause of bloat these materials must be administered with care. Your veterinarian's records will show which product has worked best for him on the type of bloat encountered in the case at hand. Despite their fine work none of these remedies is a fool-proof cure.

Veterinarians being among the busiest men in the country these days it is highly probable that you are going to have to take steps to treat your ailing animal before that gentleman shows up. If at all possible keep the animal on its feet and keep it moving. Chasing an animal up a steep hill or ditch bank raises the position of the cardiac valve to where the gas is located and induces rapid belching. The old device of tying in the mouth a gag that has been dipped in turpentine or some other ill tasting substance is still a help at this stage.

If the cow or sheep gets down, something has to be done quickly. Various drenches have been reported to be effective in opening the cardiac valve that leads into the stomach and letting the gas escape. Here are three of the more common drenches.

Vinegar—three to four pints for mature cattle;
½ pint for mature sheep.

Mineral oil (White)—2 to 3 pints for mature cattle with 2 ounces of turpentine.
6 ounces for mature sheep with ½ ounce of turpentine.

Milk and kerosene—2 pints of milk with ½ pint kerosene for mature cattle.
½ pint milk with 2 ounces kerosene for mature sheep.

Passing a plastic garden hose down the throat and into the stomach also is an aid in opening the cardiac valve though very little of the gas will escape through the tube.

If none of these remedies brings relief, sticking with knife or trocar is the line of last resort. Again, a veterinarian should do this job, but since we're assuming he hasn't yet arrived the job will be up to you. Simply stab into the paunch at the point of greatest distention in the left flank with a *clean* instrument, having first cleaned the hair and skin in the area with iodine.

So far as the principles of surgery are concerned it just isn't sound practice to pierce a hole from a contaminated area, the skin, through an uncontaminated area, the body cavity, and into a contaminated paunch. This leaves the body cavity open to contamination from two sides and the only helpful element in the situation is that the paunch is pressed so tightly against the skin that there is very little space left exposed to infection. Few animals that have been stuck are their same old selves again even after recovery. Though time may prevent his performing the operation, the veterinarian's advice must be followed carefully after treatment.

While there is presently no real bloat preventive supplement available one possibility that is being looked upon with favor is a so-called "buffer" that could be added to the salt or feed to prevent rapid changes in the paunch from an acid to a basic condition. It has been shown that when the paunch becomes excessively basic or alkaline stomach movement stops and belching is reduced. This occurs when the paunch has a pH of 7.5 or 8.0. At the Kentucky Agricultural Experiment Station sheep have been killed experimentally with small doses of the base, sodium carbonate. These experiments afford good grounds for the previously mentioned dosing with vinegar. Cattle in particular must be kept on the acid side. A cow secretes and swallows about 13 gallons of saliva every 24 hours. This saliva has a pH of 8.1 and if something goes wrong so that this base is not changed to acid by normal metabolism it will very likely stop stomach movement and belching.

When this buffer supplement or another preventive is perfected it is quite possible that it will be the ounce of prevention that will eliminate the need for many pounds of cure Until that time bloat will continue to be known as Cow's Gout —a malady associated with high living.

THE AUTHOR: Walter E. Thomas, has just assumed his duties as manager of the Big Stone Farms with headquarters at Milford, Delaware. He received his doctor's degree from Cornell University and for the past three years has been on the staff of Kentucky College of Agriculture, teaching and doing research on bloat, rumen bacteria and the minor elements.

Built by famed English craftsmen, powered by America's workhorse Briggs & Stratton Model 8 engine, priced at a modest $269, HOWARD

ROTAVATOR COMPANY'S sturdy new "BANTAM" is revolutionizing cultivating practices! Plows, discs, harrows in ONE operation.

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Rugged, hardened steel blades cultivate down to 7 inches, and do it fast! See your local dealer or write HOWARD ROTAVATOR COMPANY, INC., Box F, Arlington Heights, Illinois, 1220 Key Highway, Baltimore, Maryland, or 241 Loomis Ave., San Francisco, California, to get FREE demonstration on YOUR land!

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The outstanding group of tillage tools for soil conservation and restoration, wind and water erosion, moisture control.

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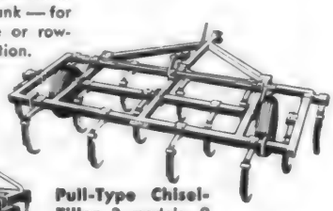
Wheel Type Tandem Disc Harrow. Heavy-Duty. 7' to 14' models with 16"-18"-22" alloy steel disc blades.

K7 and K9 One-Ways Direct mounted. Plow 4' or 5' swath, 22" discs 8" spacing.

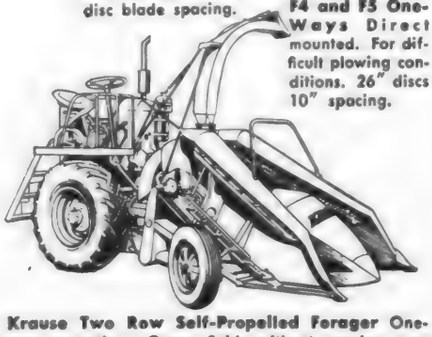
Lift-Up Chisel-Tiller 5 or 7 shank — for deep tillage or row-crop cultivation.



Pull-Type Chisel-Tiller 3 models, 9 sizes with adjustable wheel and shank spacing.

2-3-4 Disc Plows Direct mounted for 3 point hitch tractors. Adjustable disc blade spacing.

F4 and F5 One-Ways Direct mounted. For difficult plowing conditions. 26" discs 10" spacing.



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LAMB POOL

(*Continued from page* 55)

gle Blue, Red and Yellow, and of these the top three are all lambs that will grade choice or better on the packer's rail. Lambs that do not meet these standards are not considered pool lambs at all on that market and are frequently resold for further feeding.

The day on which Bitzer and his friends were conducting their little resume of lamb pool history, 623 lambs arrived at the Fayette County Producer's Yards. Of these only 34 head were unacceptable as pool lambs and the remainder broke down like this:

	No.	Average wt.	Price per cwt.
Double Blue	287	92 lb.	$31.50
Single Blue	95	88	30.50
Red Dot	92	86	30.00
Yellow Dot	115	82	28.50
Total	589	averaged	$30.50

—this after a week of declining prices and on a day when the Chicago market registered an average of $28.20 and a top of $30.00. As was just noted, these Fayette County lambs are graded on a more rigid basis than generally obtains in most pools. Yellows in the average pool would never bring such a price in comparison with the top grades.

Of the 34 head not included as pool lambs, 12 were classified as light fat and sold at $29 while 22 unfinished lambs brought $23.50.

Objections

Packers are eager to buy these pool lambs as they provide a uniform run as to size and quality and are a guarantee of good yield; and since the largest and most constant demand for the best carcasses is from the big cities of the East, the small packer with a weekly kill of only a few hundred or less has a hard time buying in the pools. The most obvious criticism of the pools is their dependence on a handful of large buyers to the extent that some are closed markets to the small packer.

The operators justify this situation on the necessity of selling the entire offering to one packer who can handle numbers and buy the best. They point out that if a small packer were allowed to bid up the price of a pen of, say 90 red dots, higher than the market value of a big bunch of some 250 or 300 double blues, the grading system would soon lose its effectiveness as a device to insure a premium to the top producers. This would prove a serious blow to the entire long range program behind the pools.

In general it can be said that this method of insuring a better price to the more efficient producers has won the approval of all branches of the industry, the pro-

THE HERDSMAN who gets out with his flock and knows how the lambs are doing, will end up with more Double Blues in September.

CROWDS follow the Krause Two-row self-propelled Forager working at Kasson, Minnesota

"NEVER BEFORE A HARVESTER LIKE THE KRAUSE FORAGER!"

Jake Plett clears $5,000 net in 14 weeks . . . establishing a profit-taking record

A MAN with an eye for fast forage profits is Jake Plett of Inman, Kans.

Plett cleared $162 a day, less gasoline and oil, in one work-week with the new Krause Self-Propelled Forager.

Owner-operator of a Self-Propelled Forager, Plett paid for the machine in 60 days, and pocketed the profits from then on.

"My Krause Forager paid for itself in my first 60 days of custom cutting," Plett reported.

"In 14 weeks I cleared $5,000 net above all expenses."

Most farmers give swift approval to the one-man operation feature. The Forager handles the job, with one trip over the field. Only one man is required for the cutting, chopping and loading operation.

The Forager handles forage harvest without running over several rows of valuable crops. It harvests *all* silage crops grown in rows . . . from tall corn to shorter sorghum varieties.

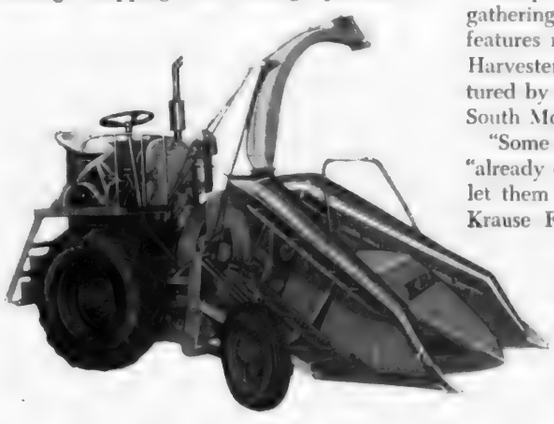
With its widespread points, full floating with positive adjustment for ground clearance, the Forager cuts two rows at a time, spaced from 36" to 48". No stalks are missed.

A heavy-duty combine type variable speed V-belt Drive, hydraulically controlled, permits ground speeds infinitely variable from 1½ MPH to 15 MPH with engine speed remaining constant.

Field-chopping converts *all* the crop to the most desirable feed.

Reciprocating sickle bar, power-driven gathering unit, standard cutter and other features make this the most usable Forage Harvester you've ever seen. It is manufactured by the Krause Plow Corporation, 375 South Monroe, Hutchinson, Kansas.

"Some of my customers" said Jake Plett, "already own pull-type harvesters, but they let them stand idle in favor of hiring my Krause Forager."



Krause Forager's many automotive features minimize operator effort . . . steering, 3-speed transmission, variable speed drive, are only a few of its many profit-making advantages.

FAST FORAGING — Krause Forager can fill average silo in one day.

SAFE FORAGING — Forage is handled without running over the crops.

ECONOMICAL FORAGING — With Krause Forager, one man handles harvest.

VERSATILE FORAGING — Harvests anything from tall corn to sorghums.

PRACTICAL FORAGING — There's no waste with field-chopped ensilage.

Need help on any of these 6 common water supply problems?

MORE CAPACITY. Can you turn on two or more faucets and get a full stream of water, or is your water pump too small to deliver the capacity you need?

WORN OUT SYSTEM. Most systems in service ten years or more are ready for replacement because they weren't designed to provide the quantity of water needed on a modern farm.

HAND PUMP REPLACEMENT. The old fashioned "pump and carry" system is costly. With a hand pump you spend about 240 hours a year pumping water. At wages of $1 per hour, that's $240. It costs less than 1c a day to run a Myers water system.

WANT AUTOMATIC APPLIANCES? To have an automatic washing machine or dishwasher, an eletcric water system is a must. With an automatic water system, it's also possible to put in a Myers water softener if the water is hard, has iron or other impurities.

WATER TO INCREASE PRODUCTION. Put water in the barnyard. With fresh water all the time cows give 10 to 22% more milk; chickens 10 to 20% more eggs. Cattle and pigs gain full weights faster on an adequate supply of water.

WATER FOR BETTER PASTURES. By piping water to the "South-Forty" and using automatic waterers your livestock spend more time on prime grazing — less searching for water and trampling overgrazed pastures.

Your Myers Dealer is a water supply expert

He's trained to select a pump of proper capacity and horsepower for your requirements. He knows how to figure water pressure, pipe friction loss, and sewage disposal systems. He has at his disposal the laboratory facilities at the Myers factory in Ashland, Ohio, for scientific analysis of water as to hardness, acidity, iron content or turbidity. No obligation on your part if you ask his advice.

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for quality and dependability

ducers, the marketing organizations and the buyers and packers. Some of the independent sheep brokers claim, and with apparent good reason, that the system is just too expensive. It means having at least one extra man on the payroll of any firm that would try to set up a pool—a man who is on hand to visit the farms at the producer's call to top out lambs and who can grade the offerings on the market. The independent sheep broker says that since the pools are sponsored by county sheep improvement committees which are usually an Extension Service committee, the county agent or his assistant and farmer committeemen work on the program without compensation. This is true, but the services of the county agent are also available to any local private markets and there are old line agencies that are using this service.

One of the items of expense, upkeep on pens and scale, is met in some pools by charging a nickel a head on all lambs sold.

One frequently voiced objection to the lamb pools goes something like this: "Certainly the packer will pay a premium of a dollar or a dollar and a half for ten or fifteen per cent of a pool if he can get the rest of them at a nice mark down." Statistics on some pools might bear out the truth of this remark. In the better pools, however, as high as 80 per cent of all consignments make the two top grades. Of the almost 72,000 lambs sold through the Ohio pools in 1952, fully fifty percent graded single blue or better and brought premium prices. Prior to pool history, as mentioned before, exactly the opposite was true and a good fifty percent of the lambs sold were unable to meet standards of good or better.

This improvement factor has influenced the entire sheep industry in pool areas. Purebred breeders have a steady outlet for their rams. Producers are more quality conscious. Change is reflected even in non-pool sales, somewhat in price, but certainly in the quality of the offerings.

All of which seems to prove not that marketing manipulation can sustain high prices, but that a sound program of breeding, feeding and quality merchandising is the key to dollar and cents gains all along the line from the farm to the housewife's market basket.

UREA

(*Continued from page* 57)

Scientists have calculated this stimulation effect at 2.62 times the weight of the urea itself. Urea is given this "protein equivalent." Since soybean meal, one of our common protein concentrates, has a crude protein content of about 40% it takes approximately 250 pounds of it to get 100 pounds of protein. With urea, we need only about 38 pounds to get 100 pounds of protein.

Protein is not measured after the way corn or wheat is measured. With grain, we put so many shovels of it into the scale and weigh it, and then we say "here are 10 pounds of grain." But there is no way to shovel up the protein in urea, bean meal or other concentrates. Instead, scientists measure the nitrogen in it and then multiply the nitrogen by 6.2 and call that figure the amount of protein in the urea, bean meal or concentrate that they are measuring.

Since urea is made of ammonia and carbon dioxide it is very high in nitrogen and when its nitrogen weight is multipled by 6.2, scientists come up with a fabulous amount of protein per pound of urea.

"So," says the cattle feeder, "if this new stuff is so wonderful and costs so much less than the protein I'm using, why not feed it for my whole protein supplement?" The answers to that one are: The production of urea is so short that even if you want to try feeding it you will have a difficult time buying it. The most important reason why urea isn't going to replace other proteins is that in large amounts, or as the exclusive protein, it may be injurious to animals.

Dr. Wise Burroughs of Iowa State College, who has done much of the experimental feed work with it, has this to say: "There are limitations as to how much urea can effectively and safely be utilized by cattle. In general, urea is utilized most efficiently when fed in small amounts (i.e., less than 0.1 lb. per animal per day) and less efficiently when fed in large amounts in cattle rations (i.e., more than 0.25 lb.

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Don't burn Your Corncobs! . . . Turn them into profitable Low-Cost Roughage with a BOWSHER MILL . . . perfect for grinding corncobs, ear corn, shucky corn and shelled corn, giving a granular product WITHOUT DUST.

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Cone shaped burrs, two sets of knives give extra capacity up to 220 bu. per hour.

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Hopper adjustable to three positions. Spout swings in complete circle, saving shoveling.

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Introducing—The most compact baler ever built!

NEW HOLLAND'S *sensational* MODEL "66"

Makes hay baling practical on almost any farm
It's self-powered...makes square, man-size bales
Costs hundreds of dollars less!

The surprise of a lifetime! That's the New Holland Twine-Tie "66"! We'll wager you've never seen a baler so compact in design . . . so completely new!

You'll be amazed the first time you see the "66." It's shorter and lower than most balers. It's designed to operate with a one- or two-plow tractor. It's priced so low that even small-acreage farmers can now enjoy the finest in baling equipment.

Now you can enjoy the benefits of having your own baler on the farm. You can bale your hay the moment it's ready to come in, and bale it fast for minimum spoilage by sun or rain.

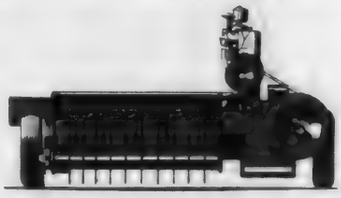
New "pre-compression" baling action gives the "66" an amazingly high capacity. It can kick out 6 square bales a minute . . . package up to 7 tons of hay an hour! And it bales anything—clover, prairie hay, sudan grass, maize.

See your New Holland dealer right away! He's waiting to go over the "66" with you feature by feature . . . give you proof positive that you can't buy better at any price!

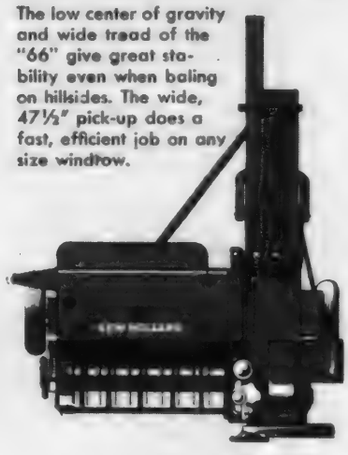
Now! A complete line of balers for every haying need!

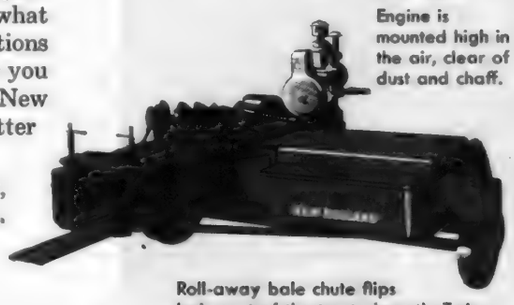
The New Holland "66" proudly takes its place with the famous "77" twine-tie and the Model "80" wire-tie—the highest capacity balers in the world. No matter what material you bale or what field conditions you work under . . . no matter whether you feed, sell or custom bale . . . there's a New Holland that can do the job faster, better and at lower cost.

The New Holland Machine Company, a subsidiary of The Sperry Corporation.



The low center of gravity and wide tread of the "66" give great stability even when baling on hillsides. The wide, 47½" pick-up does a fast, efficient job on any size windrow.



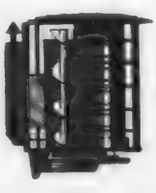


Engine is mounted high in the air, clear of dust and chaff.

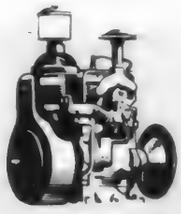
Roll-away bale chute flips bales out of the tractor's path. Twine box is easy to get at—holds four, full-size bales of twine.

NEW HOLLAND *"First in Grassland Farming"*

Knotters are the same as on the famous "77," proven in thousands of hours of successful baling.



Adjustable, horizontal wadboard gives high capacity, builds a square, even bale every time.



15-h.p. engine gives steady power to handle heavy windrows without a falter.

Free Catalog Illustrated catalog gives complete details on the New Holland "66." For your copy, write: New Holland Machine Co., 903 Cedar St., New Holland, Pa.

Name_____

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Town_____ County_____ State_____

Number of acres farmed_____ Custom Operator_____

Do you now own a baler_____ a forage harvester_____

Check if you would like a demonstration on your farm ☐

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Sawette

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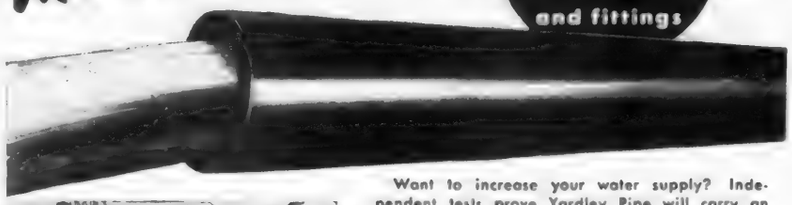
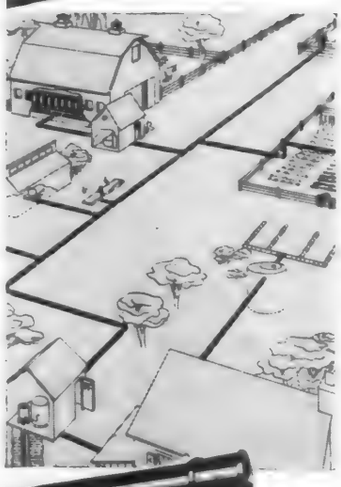
25% MORE WATER

YARDLEY PIPE and fittings





Want to increase your water supply? Independent tests prove Yardley Pipe will carry an excess of 25% more flow than steel pipe for the same head loss. Other big advantages include:

. . . longer service because it won't rot, rust or corrode.

. . . handles and installs faster, easier, because it weighs 1/8 as much as steel.

. . . requires fewer fittings, cuts installation costs up to 60% — jet wells even more.

Yardley Pipe is warranted to be made of virgin material. Engineered for every cold water use . . . drinking water or corrosive liquids; suction or discharge; wells, distribution lines or disposal systems. Resistant to damage from animal wastes, acid and alkaline soil. Smoother walls decrease build-up of bacteria-bearing film.

Made of both rigid and flexible materials in a full range of sizes ½" through 6". Standard fittings and adapters. For more water, lower costs, longer service . . . investigate Yardley Pipe.

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per animal per day). The upper limit of effective and safe urea feeding has not been fully established experimentally in all types of cattle feeding. Urea is not toxic to cattle when properly fed in small amounts. On the other hand, urea is definately toxic to cattle and may result in death losses if improperly fed in too concentrated a form."

Dr. Orville G. Bentley of the Ohio Agricultural Experiment Station at Wooster gives these thoughts about urea. He says: "There are many unanswered problems concerned with urea feeding that need to be studied. Apparently, feeding urea does destroy the vitamin A in a ration if it is fed in an oil form. Vitamin A in a dry, powdered form, is not affected. Other vitamins in feed do not seem to be harmed. Cattle seem to 'start' slow when urea is fed. In a month or so they 'catch up' and may even gain more rapidly during the latter phases of the fattening period than steers fed the usual protein concentrates. The reason for this is not apparent but attempts are now being made to find methods for improving the performance of steers during the early part of the feeding period. Because of the important role of rumen bacteria in urea use, extensive studies are now in progress using a laboratory or 'artificial' rumen to study the facts required for good urea utilization. A better understanding of these requirements may lead to improved methods of urea feeding which will overcome the initial growth lag in feeders."

Feeds Mixed with Urea

Feed manufacturers now use urea in mixed feeds. They are usually better able to do it than the farmer because it has to be thoroughly mixed with care. Several manufacturers now offer urea in connection with bean meal, or molasses as a concentrate. The supply is limited. The DeKalb Molasses Feed Company of DeKalb, Illinois makes a small bite-size, concentrate of molasses, urea and bean meal: The Rockport Grain Company of Rockport, Indiana makes a concentrate of corn cob, urea and molasses: The Pacific Molasses Company of San Francisco makes "Promol", which is simply molasses mixed with urea: The Gooch Milling Company of Lincoln, Nebraska, makes a soybean pellet with urea in it.

All natural feed meals (such as soybean, linseed, cottonseed) and hays that are rich in vegetable protein, also contain various amino acids. These amino acids are not present in urea. Mother Nature is more bountiful than the chemist who makes urea synthetically. Natural protein that you get from meals also contains additional richness in the form of certain feed values which have still eluded the scientist in his synthetic proteins. Urea cannot take the place of natural (i.e. meal or hay) proteins. It can substitute for some vegetable proteins in the cow's

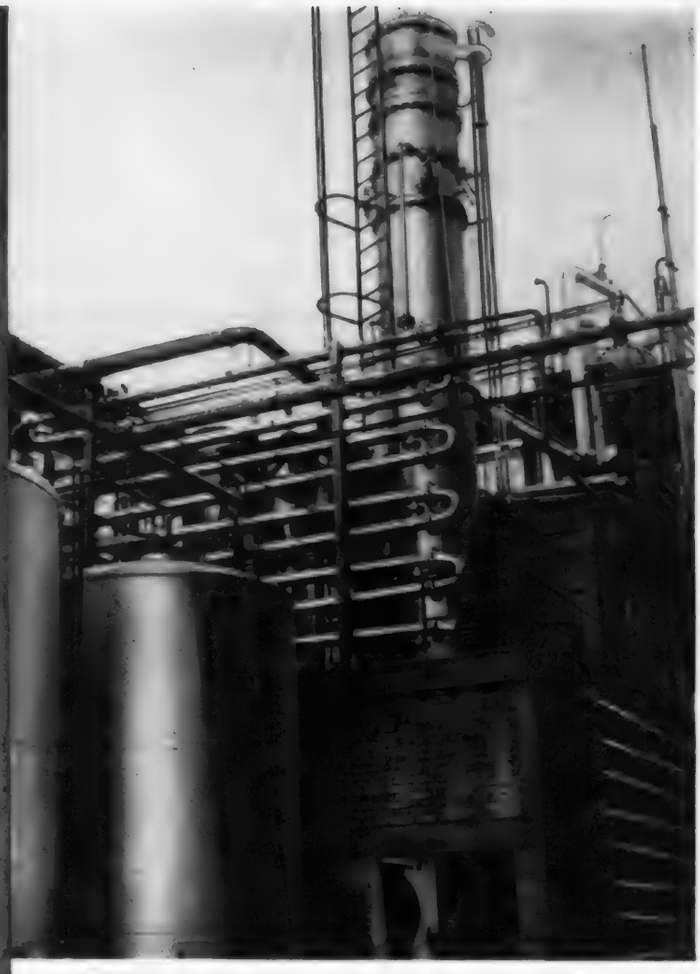
VULCAN

ENGINEERS and BUILDS

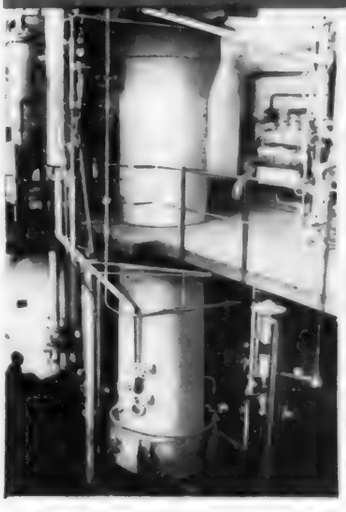
UREA

PLANTS

High purity urea for cattle feed and prilled, free-flowing urea for fertilizer can be produced in Vulcan built plants utilizing the Swiss Inventa process. Crystalline urea can also be made for plastics and chemicals. Raw materials are ammonia and carbon dioxide from natural gas or other sources.



Commercial scale manufacture of Urea by the Swiss Inventa Process has been carried on in this plant at Ems, Switzerland, since early 1949.



UREA SYNTHESIS

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THE SWISS INVENTA PROCESS is commercially proven, highly efficient and substantially eliminates corrosion problems in plant equipment. It has been adapted to American requirements and is offered by Vulcan Engineering Division for the construction of plants in the United States and Canada. Send Vulcan your inquiry or problem today.

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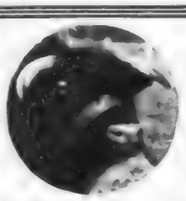
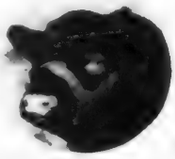


LOOK AT THIS SHOW RECORD!



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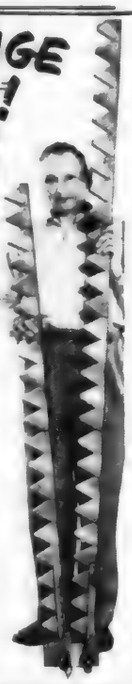
- Keep sickle bars sharper . . . grind your own with this new-type low-cost grinder. **Anyone can do a first-class job!** Grinds sickles from 1 to 7 feet long . . . produces a uniform edge, maintains proper bevel, extends life of sickle bar. Grinding stone mounted on a swinging arm . . . grinds coming and going. Spring-loaded table keeps sickle bar against stone.

Two stones of different angles are available. Easily adjusted to compensate for stone wear. It's sturdy, simple, saves its cost quickly. A big hit with farmers, park and cemetery maintenance crews, and custom grinding shops.

Drilled to hang on wall or fasten to bench. Available with 110 volt, AC electric motor or without motor. Can be used with ¾ h.p. engine for field work.



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diet and thus reduce the cost; but urea will never supplant natural protein.

The Professors on Urea

Professor W. M. Beeson of Purdue, who won the American Feed Association award in 1952 for his work in experimental feeding, emphasizes the following points in feeding urea:

"1. No more than one third to one half of the protein should be replaced with urea in a supplement for cattle.

"2. For every pound of urea added to a mixture, 6 to 7 pounds of a carbohydrate such as corn or molasses should be added to replace the energy lost. Urea has no energy value but can be made into protein by bacterial synthesis if sufficient energy feed is also supplied.

"3. Urea should be mixed thoroughly because it is a toxic compound and at high levels will cause harmful effects.

"4. Urea feeding gives the best results in the well-balanced diet so that the bacteria have all nutrients necessary for the synthesis of protein and other nutritional factors.

"5. The presence of sulphur in the diet appears to be helpful in protein synthesis from urea."

Professor A. L. Neumann of the University of Illinois goes a step farther in his ideas on the use of urea. He says: "There is a good deal of evidence that we can safely replace all of the nitrogen in the commonly fed protein supplements with urea, provided we add back energy (that is grain, molasses and bean meal) and minerals which the replaced protein supplement contained and provided a thorough mixing job is done."

Neumann is now working on the first feeding test to determine whether urea feeding will affect the reproductive ability of cattle. He is feeding bred heifers and cows on urea fortified feed and will have some preliminary answers this year.

Beef animals in this country, probably the best fed in the world, are being underfed when it comes to the protein in their diet. The best estimates are that they are getting far less than 10% protein, a figure considered the minimum for good gain. Costs on protein are high, and they are high because the supply is short. Government figures show that 50% more oil meal concentrates would have to be produced if we were to bring the protein in feed up where it should be. Synthetic fabrics have discouraged the cotton growers, and that causes the cottonseed meal to be short. Synthetic ingredients in paint have cut down on the production of linseed oil meal, and new materials for plastics (like urea!) have not helped the soybean oil meal picture. So, if we are short today what will happen in 1975, when the population will have increased to the point where four will sit down at every dinner table where three sit now?

(*Continued on page* 126)

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True-Vac

with the Safety-Serum Balancer

you can get

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AGAINST HOG CHOLERA

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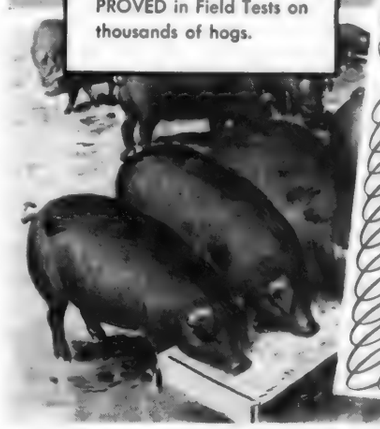
PROVED in Field Tests on thousands of hogs.



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TRUE-VAC administered with the SAFETY-SERUM BALANCER offers a new safe means of providing solid immunity protecting pigs from nursing age to market pens.

No farmer will neglect to vaccinate his pig crop with this low-cost immunization.

GET The HOG CHOLERA VACCINE True-Vac with the Safety-Serum Balancer **TODAY!**

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Irrigation News

WEATHER: Made-to-order!

FROM ALUMINUM COMPANY OF AMERICA
Member of Association of SPRINKLER IRRIGATION EQUIPMENT MANUFACTURERS

VOL. 4 NO. 1 WINTER 1952-1953

Virginia Cattleman Tells How

PORTABLE IRRIGATION SYSTEM SAVES $4,000 THE FIRST YEAR!

Above: Lightweight Alcoa Irrigation Pipe being laid at Quarry Hill. Owner says the cattle and sheep seem to know what to expect—follow the system from one field to another.

Left: Quarry Hill, Hot Springs, Virginia, transformed to a fertile, green pasture—after two applications of water. Eight and six-inch Alcoa Aluminum Irrigation Pipe was used for the main line and the laterals.

Quarry Hill, Hot Springs, Virginia—Last year, in 1952, T. Kenneth Ellis of nearby Quarry Hill Farm saved $4,000 in feed bills by installing a portable irrigation system. Finding that his pasture lands were not producing sufficient silage for his cattle—even in normal years—he turned first to the purchase of feed which he estimated would cost him $4,000 a year.

Then Mr. Ellis made his decision to irrigate and within a short time had installed a system using Alcoa Aluminum Irrigation Pipe. Now, with the summer past, he tells of the results.

"It is without a doubt," writes Mr. Ellis, "the best piece of equipment I have ever bought for the farm. The response of the fields to the applied water is almost beyond belief. *Your system has certainly helped my farm!*" And he closes by saying, "I cannot tell you how pleased I am with it."

Cattlemen and farmers everywhere are learning one important fact about irrigation. While many farmers have prospered by irrigating during a *drought*, thousands of others are finding that crops harvested in a year of *normal rainfall* are doubled—even tripled—when sprinkler irrigation is installed.

Whatever your crop,
Wherever your state,
To add to your profit,
Just irrigate.

FREE BOOKLET

Mail coupon below for Alcoa's 1953 *Pipelines to Profit* Booklet containing helpful facts on planning an irrigation system for *your* farm.

Be sure you get genuine Alcoa Irrigation Pipe. Look for this yellow and blue Alcoa label.

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UNLOCKING YOUR PASTURES

Farmers are finding that there is nothing like the flexible harrow to stimulate pasture growth and unlock the fertility in manure clumps.

WALKING through a pasture with Norris Berk was always a lot of fun—and an unusual piece of exercise. For Norris was a real good farmer and a naturalist at heart. He knew every weed and every grass that poked its head up through the soil and he was always good for a flow of sage remarks on what's good and what's bad for grazing and how to see to it that your stock get all the most appetizing tid-bits that nature has to offer. But most distressing to this Kentucky hill-topper were the little mountains of fresh manure that punctuate every well stocked pasture. Norris considered it his moral duty to explode each of them into fragments and this is where the exercise came in. With boot and stick, a kick here and a swing there, he'd advance from pile to pile with all the grace of a ballet dancer until he finally had his companion joining right in the activity.

"Manure's the most wonderful grass grower in the world," he'd say as he aimed a kick, "but not when it's all stacked up in one spot. You have to spread it around. Look at that clump of tall grass over there. Came right up through a dunghill that never got broken up and it's bitter as gall, so no cow will touch it. And you can't blame them either."

There's no doubt at all that Norris had the right idea about the contrast between the high value of the organic matter and mineral elements in manure when well distributed and its relative uselessness when locked up in thousands of tight little piles all over a field. His methods of solving the problem, though, were just too far from practical.

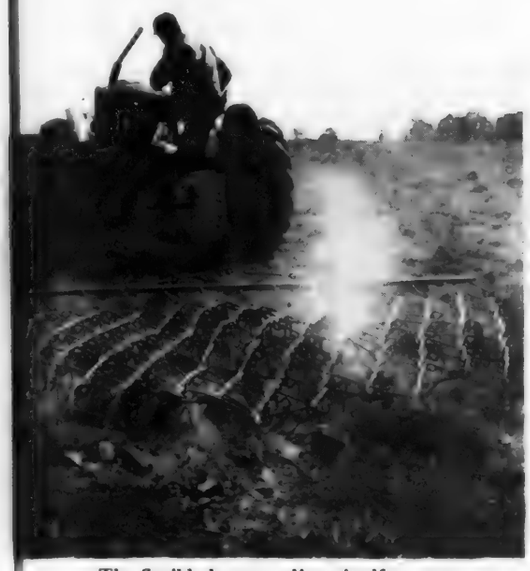
Fortunately, there are other and better

Roofing News

WEATHER: No longer a Worry!

FROM ALUMINUM COMPANY OF AMERICA

VOL. 1 NO. 1 MARCH, 1953



The flexible harrow adjusts itself to every contour; digs into every hollow and tops every ridge.

ways of doing this job. Probably the best way right now is with one of those English flexible tine harrows that can be dragged over fields to give them a real good back scratching.

Some call these implements chain harrows; but they're much more than just a lot of chains linked together. Every link on the chains—if that's what you want to call them—in these harrows has a flexible tine three and a half or four inches long. Those tines are the fingers that do the scratching and that grab big gobs of manure and spread them evenly over the field. They are made of specially tempered spring steel to withstand the gaff of being dragged back and forth for miles over every kind of terrain and are self-sharpening. Life expectancy of the implement runs around fifteen years of ordinary work.

The harrow is generally eight to twelve feet wide and six to eight feet long, the forward or hitching end being attached to a long iron bar? On some models this bar is made with three attaching points on one side of center and two on the other so that it may be drawn on the bias if desired. For fine turfs—golf courses, athletic fields, large lawns—they have become a necessity. Here, of course, there is no problem of scattering droppings. The purpose is to stir up the turf without actually opening it up, to give it a first-class massage.

Cy White, who operates Elmsmeade Farm in Kentucky's rich Fayette County is an enthusiastic rooter for these handy pieces of equipment. "You can't beat them," White says. "We have four of them, two on this farm and two on the farm across the road. We've had them eight or ten years and use them con-

52 SQUARES OF ALCOA ROOFING APPLIED IN A DAY AND A HALF!

Iowa Farmer Reports Livestock Doing Better Under Aluminum Roof

Bronson, Iowa—Fifty-two squares of Alcoa Aluminum Roofing were applied to Al Wendel's combination shed and barn in less than forty-eight hours! "Three of us did the job in a day and a half," said Mr. Wendel. The speed with which the roof went up is attributed to the fact that aluminum is lightweight—requires fewer man-hours of labor to apply. A point most farmers like about it is—once it's up, *it's up to stay*. It needs no paint, yet outlasts many other materials.

Temperatures beneath the new aluminum roof, reports Mr. Wendel, are warmer in the winter—cooler in the summer. To a cattle raiser, a more constant temperature means healthier stock—and it means getting the stock to market-weight sooner.

Your nearby Alcoa dealer will be happy to give you any assistance or advice you desire—without obligation—whether it be information or estimation.

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Screening of Alcoa Aluminum puts an end to your screen worries. It can't stain light paint or masonry, can't rust-streak, gives more service, requires less care. Write for free folder that tells easy ways to replace screening. ALUMINUM COMPANY OF AMERICA, 2114-C Alcoa Bldg., Pittsburgh 19, Pa.

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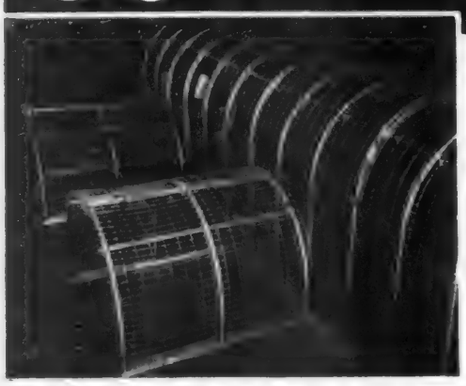
CLAY HAY DRIER
Cuts My Feed Bill
$50 A MONTH



Luverne Bauer, R. R. 2, Kenyon, Minn., says that not only does he SAVE ON FEED but his COWS PUT MORE MILK IN THE PAIL from the green, leafy 17% protein hay he made with his CLAY drier. Mr. Bauer also used his drier for corn.

OTHER CLAY DRIER OWNERS REPORT HIGH PROTEIN HAY:

Lawrence Schmitz, Waterloo, Iowa — First cutting, fan-dried alfalfa, TESTED 16½% PROTEIN. Field-cured second cutting, same field, was only 9.65%. "FEED SAVINGS ALONE WILL PAY FOR MY DRIER IN TWO YEARS," says Schmitz.

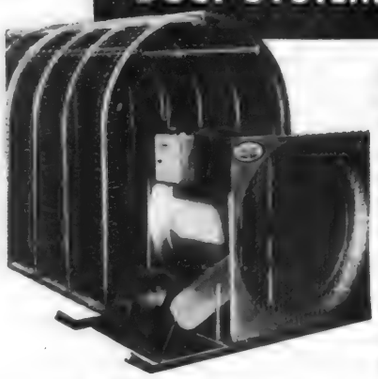
Lester Bradley, Dalton, Wisc.—First cutting, mow-dried clover, TESTED 15.85% PROTEIN. "I have tried other makes of driers but the CLAY BEATS THEM ALL."

Ben Nannen, Pearson, Iowa—Third cutting, mow-dried alfalfa, TESTED 16.5% PROTEIN. "I make better hay than ever before with my CLAY crop drier."

Orn Nedrow, Somerset, Penn.—Third cutting, mow-dried alfalfa, TESTED 18.7% PROTEIN.

John Young, Cedar Falls, Iowa — Second cutting, mow-dried alfalfa, TESTED 18.4%.

THE NATURAL AIR OPEN-DUCT SYSTEM OF DRYING



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tinually from late winter until such time in the spring as the grass gets too high for them. Ours are twelve feet wide and we use them two at a time hitched abreast and pulled behind a light tractor. Criss-crossing a field with them tears up all the old matted grass and gives the new plants the air and sunshine they need for vigorous growth.

"Pastures are a mighty big item down in this livestock country and these harrows are so darn handy that they've become pretty common around here. Just about every farm has at least one and those fellows who don't have them are always anxious to borrow one.

"Breaking up manure clumps is a job they do in fine style. That not only makes for better grazing but is a valuable control so far as internal parasites are concerned. Those are no small problem on a farm like this where we are trying to raise a few real good horses along with our cattle. The

THERE ARE no more manure clumps to produce unpalatable clumps of grass after the tines of the flexible harrow tear them apart.

harrow, being flexible, follows all the contours of the ground and does a thorough job of pulverizing the dunghills so that the eggs of the bot flies and other parasites are exposed to the sun and wind and are destroyed in the weathering process."

Horse breeders, it might be noted, have always gone to great lengths to try to prevent re-infestation of their stock from droppings. In days of more plentiful labor supplies, men with shovels and baskets were a common sight in bluegrass meadows picking up the droppings to be hauled off the field. One Virginia breeder even went so far as to build a small shed equipped with facilities for steaming the manure that had been picked up in his pastures. This manure was then spread in the cattle lot to be broken down even more by the trampling of the cattle before it was respread on the fields.

The English harrow has, in the past few years, relegated these practices to the museum of antiquity. It is doing a better job much more efficiently.

Cy White feels that the flexible harrow is a valuable aid in top dressing with fertilizer, too. The practice is to spread the fertilizer after a thorough scratching then to re-harrow so that the fertilizer is shaken off the plants and down to contact with the soil.

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20 PAGES of cost cutting ideas in farm operation!

This Stoody Farm Hard-Facing Handbook is *yours!* Written simply, profusely illustrated, it tells how to make all wearing farm tools and equipment last longer with Stoody Hard-Facing Alloys. Shows preparational details, where and how to apply Stoodite for greatest life increases, lower operating costs. Covers all commonly used implements, is chock-full of *proven* hard-facing know-how!

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No cost—just fill in and return the coupon, but do it now!

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Get a sure stand of grass with less seed

THIS BRILLION Sure-Stand Grass Seeder and pulverizer seeds grass within the top half inch of a fine, firm seedbed . . . gives every seed an opportunity to germinate and grow into the grass you want.

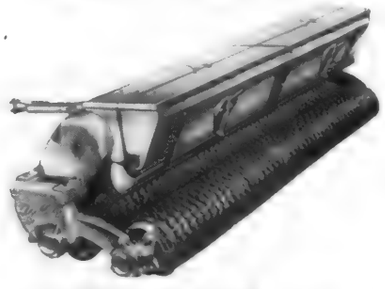
Note how this seedbed is free from lumps which have been crushed by the front roller. A metering device accurately counts out the seed.

After the seed is dropped on the pulverized seedbed, a rear roller covers the seed to a maximum depth of ½ inch, and gently packs the soil around it. The result is a uniform seeding at the rate desired—no wasteful overseeding — and the seeds themselves are in contact with moist, nourishing soil where they can germinate quickly.

The Brillion Sure-Stand Seeder does this all in one simple operation — one time over the field. If you are broadcasting seed, or seeding with grain drill, which allows seed to fall onto rough ground or open spaces between lumps, it will pay you to get the Brillion story.

Farmers report saving enough seed the first year to pay for a Sure-Stand.

BRILLION IRON WORKS, INC.
Dept. SG 3-3 • Brillion, Wisconsin



Brillion
SURE-STAND SEEDER
"TUCKS EACH SEED TO BED — IN THE TOP HALF INCH OF SOIL."

The flexible harrow weighs only about 275 pounds, just enough to maintain the pressure needed on the tines as it does its job, so there is no trouble at all in kiting along over a field with it in third gear.

Breakage, apparently, is no problem as dealers, even in sections where the harrows are most common, report no demand whatsoever for replacement parts.

Storage is simply a matter of rolling them up and tucking them away in a corner of the shed or barn.

Prices vary according to size and make. The Aikenhead Harrow, manufactured at Aikenhead, England, retails in this country for about $110. Fuerst Brothers and Company, Ltd., New York, distribute a ten-foot model for $76. These are certainly extremely reasonable prices in comparison with the individual who, a few years back could not find a model on the market and had one made by his own blacksmith at a cost that is reported to have run more than $400.

Stock raisers stress one point of caution about the implement. Don't just unhitch it at the end of the day and leave it in a field with stock. Some animal is sure to step into it and get all tangled up with possibly serious results. Either roll it up and tuck it in a corner or get it out of the field all together.

HOW TO BUY A BOAR

(*Continued from page* 49)

tion would be in his own litter mates and any other litters that she might have had. I would prefer to buy a boar from a second or third litter sow because she has proven her producing ability. In some cases, gilts are lucky for one trip, but just can't cut the mustard for more litters. If the dam has more than one record showing that she can farrow eight or nine pigs which will weigh over 35 pounds at weaning age and over 200 at six months, she has demonstrated that she has prolificacy, milking ability, and has passed on her inheritance for high rate of gain and economical feed conversion. The sire's record shows the ability of his daughters to produce large litters. If he has passed on this trait to his daughters, you can assume he has passed it on to the boar you are buying.

Ideally, you would want to buy a boar whose offspring have reached market weight and whose daughters have had litters that have grown to butcher weight. This, in effect, would give you a proven sire. There are a few difficulties involved in this procedure, however. In the first place, there aren't so many of these boars around. And if he is a good one he will be hard to get away from his owner or from other buyers who will be bidding on him. Then too, you run into the physical difficulty of using a heavy aged boar with gilts. This can be accomplished with a breeding rack, it is true, but only with additional labor, fuss, and bother.

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FREE CATALOG — Leading harness, hardware and implement dealers feature Boyt items. For free catalog, write The Boyt Co., Dept. L, Des Moines, Iowa.

What Does He Look Like?

There is an old saying in the hog business that there is more variation within breeds than there is between breeds. If you doubt it, try standing in front of a moving conveyor of headless hog carcasses in a packing plant and try to pick the individual breeds of the animals as they go by. To most of us they look mainly like pork. I figure, therefore, that the important confirmation points that are necesary in putting a profit on the farmer's ledger are present in every breed.

One thing we can be sure of is that the short, chunky, extra thick type hog is definitely on the way out. Lard is a drug on the market and the housewife won't buy lardy looking pork cuts. The type of boar which will produce offspring whose dressing percentages will run higher to meat is the boar to buy. The one characteristic that seems to be connected with this meat producing factor is length.

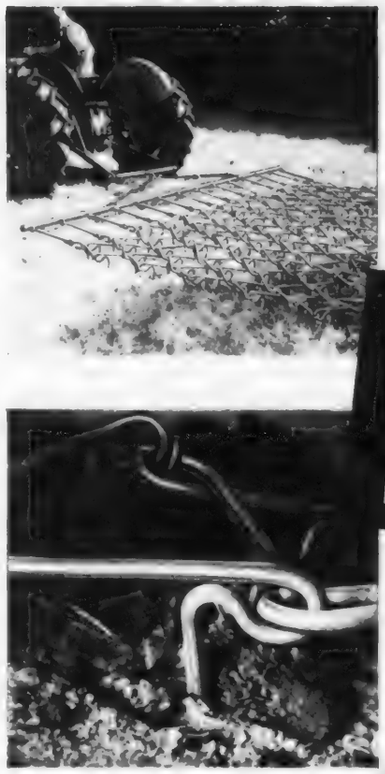
Fortunately, with length goes the ability to carry a larger number of teats. The old saw about things being as useless as teats on a boar is just a joke, brother. The number of rudimentary teats on the boar are a heritable factor which he can pass on to his daughters. I just won't buy a boar with less than 14 teats. So, you buy a long boar with plenty of teats to produce long gilts with room enough inside them to produce a large litter and with enough belly to hang 14 teats on.

The boar should be smooth and strong across the top of his back—factors which are matters of production importance. A boar with a long sagging sway back will pass these characteristics on to his daughters. A sway-backed sow will have difficulty getting around and keeping healthy when she is heavy with pig.

The boar's feet should be straight and his pasterns short because he will need good underpinnings to hold him up and keep him going after he gets older and takes on weight. His daughters will need them too, particularly under a program where farmers keep sows over for more than one litter. Good legs and feet are also an important factor when hogs are fed on concrete dry lots.

The boar should be masculine looking—certainly enough so that he can be identified as a male. He should be wide and deep in the body, particularly full between the front legs. Some years ago I had an experience with one of the inbred lines which had been bred so narrow they seemed to have bred the lungs right out of them. At least mine were much more susceptible to pulmonary disorders than other breeds.

It goes without saying that the buyer will avoid such obvious defects as hernia, lameness, or a boar with an undescended testicle. These are characteristics which are, of course, bad in themselves and which may be passed on to the offspring.



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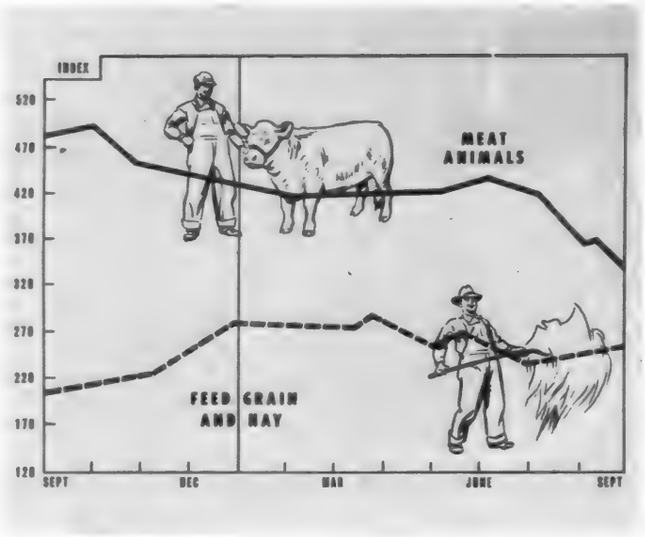

Here's How

You can help Increase Livestock Profits in the face of lower prices and higher costs

WITH costs rising and market prices edging downward, livestock raisers are finding themselves in a tight profit squeeze. The problem is how to maintain normal profits.

Many farmers are finding the answer in Morton Trace Mineralized Salt. Kept before livestock every day, trace mineralized salt helps all classes of animals to get more out of their feed. This better feed conversion means less cost to feed, fatten and finish. Here's why . . .

Morton Trace Mineralized Salt supplies the chlorine and sodium of salt so vital to efficient digestion and assimilation of proteins, fats and carbohydrates. It also supplies the trace minerals which influence and control the enzyme, vitamin and hormone functions — those basic activities of life that convert feed into nutrients and, in turn, build nutrients into meat, milk and wool.

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As far as general appearance is concerned, any farmer would want to avoid buying a boar with extreme jowliness or coarseness because these, in extreme cases, may affect the hog's ability to feed and will affect the carcass desirability of his offspring. There seems to be some degree of heritability in regard to temperament and it might be wise to avoid buying a boar that seems vicious since he might pass this quality on to his daughters. The daughters would then develop into the unruly nervous type of sows which are hard to handle and crush a lot of pigs at farrowing.

PRODUCTION REGISTRY records show the weaning weight and the weight at 156 days. A bathroom scales is a good way to weigh—the officials will see to it that the weight of the man is subtracted.

One trick to guard against is the over-fed hog. Many defects can be hidden under a layer of fat and the breeder is probably sales conscious enough to dress up his product. The result is that the farmer gets him home and is stunned the next morning to find that the boar is loudly snoring while three or four sows in heat are trying to root him to his feet. In most cases the boar is just plain too fat and it will probably take 30 to 60 days to recondition him for breeding.

These are the characteristics I would look for in a boar for a commercial herd. If I were buying a boar for producing purebred swine, I'd take into consideration all of the fine points that go into making him as near perfect a specimen of his breed as possible.

Health

I have been talking about the boar as though he were a statue, which he isn't. I'd also want to see him in action to see that he was alert and on his toes with smooth hair and a bright eye, for these are indications of good health. And, in my book, good health is the single most important factor in buying any animal. Beware of the lazy-slow-filthy looking boar because he might be loaded with disease or dead semen. And what good is the best pedigree in the world if the boar is not healthy, cannot reproduce, or worse yet, brings in a disease that can very easily wipe out the buyer's entire herd?

To begin with, I'd demand a boar which has been given cholera shots at least 28 days before purchase. I'd want the four weeks between the shots and my taking him because with live virus vaccines he is contagious during that period and with some

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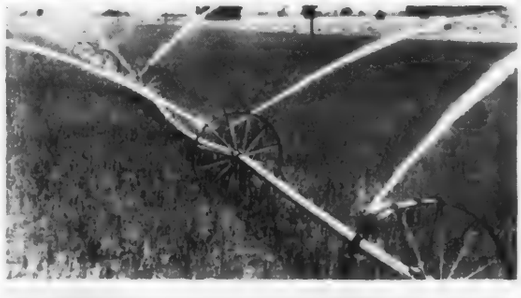

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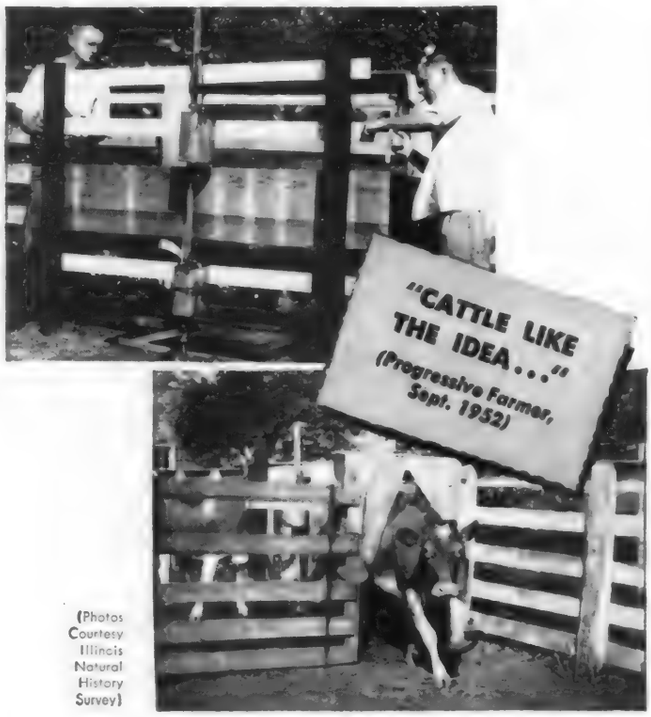

(Photos Courtesy Illinois Natural History Survey)

THE AUTOMATIC SPRAYER technique is one of the fastest growing developments in farm pest control. It was developed by the Illinois Natural History Survey and has passed the experimental stage with hundreds of sprayers already installed in all sections of the country. As the animal goes through the spray chamber, it steps on a platform which releases a measured amount of spray onto the animal.

It costs only 1 to 1½ cents per treatment with the proper Pyrenone* spray. And Pyrenone is ideal for the automatic sprayer because it presents no toxic hazards, it gives a quick knock-down and kill, it is effective on a wide range of insects including all species of flies, gnats and mosquitoes, and gives economical results. Pyrenone is the low-toxic insecticide approved for use on dairy animals, and of course it is equally effective on other livestock.

But whether you use the automatic sprayer or not, it is worthwhile to be sure the sprays you use are based on Pyrenone for effective insect control. Pyrenone is used in the products of many leading manufacturers, so when you buy, look on the label for

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(For further information on the automatic sprayer, write to Pyrenone, Dept. FQ, U. S. I., 120 Broadway, New York 5, N. Y.)

of the other vaccines such as crystal violet and B.T.V. it takes two or three weeks after the shots are given before immunity is established. I would also want to know the type of cholera shots which had been given since they give different periods of immunity. If erysipelas is a problem in the area I'd also want to be sure that the boar had been innoculated for this disease.

Secondly, I'd want to see blood tests of the herd because they do turn up reactors—but I wouldn't believe absolutely in an individual test if it were negative. That is one of the trickiest things about hogs—there is no absolutely accurate blood test for disease. It seems that the hog has the ability to wall off an infection in his body so that it won't be carried in his blood stream. Later, under stress, he can break down and blossom forth with a disease that was tested for and showed negative. I had one particular experience that proved the point to me bluntly and expensively.

I had had my eye on a boar that had been proven for production through a swine testing cooperative, and he had about the highest index for production in his offspring of anything I had ever seen. I wanted that boar and I wanted him pretty badly and finally I made a deal to buy him. I felt pretty secure because I felt I had all the necessary information to protect myself and my herd from infection.

I was going to be careful and cagey, so I checked the boar's papers for his vaccinations and shots and I had him blood tested for brucellosis (which is similar to Bangs in cattle but which causes a much more painful undulant fever in man) on the place where I bought him before I brought him home. He didn't react and he didn't react either when I brought him home and had him blood tested again by *my veterinarian*. I felt very safe, but I was being real smart and put him in a steam cleaned, disinfected quarantine pen. At the end of 30 days he again showed a negative blood test.

Then I put him in with 50 of the best gilts I had ever owned. These were gilts which had all been tested for brucellosis and were all negative. As I looked at them, the 50 best gilts and the best boar I had ever owned, I couldn't help wondering, "How much luckier can a man get?"

Then the roof fell in. In about 90 days, three of the gilts were back in heat. I had them tested and they all reacted four plus to brucellosis. I kept on testing and found that every one of the 50 was a reactor. I ended up shipping them all to the packing plant.

Something was fishy and it had to be the boar. I got the rascal in a pen again and had him blood tested. He was negative! I sent him to the State Testing Laboratory with his record and they blood tested him again every 30 days for 90 days and he never gave a positive reaction. Finally, one of his testicles was removed and it was absolutely loaded with brucellosis organisms.

Right then and there I decided that I would never buy a boar except on the basis of a herd test. There may be sleepers in a herd that won't show up, but if the herd is infected there are bound to be some that will react.

Swine are just as clever when it comes to hiding erysipelas. A blood test for erysipelas may show no reaction and yet the hog can have the disease walled-off within some organ of the body ready to break out at any time. And then there are all of the diseases which can't be detected by a blood test—enteritis, a wholesale killer, and atrophic rhinitis for which there is no test at all and, what is worse, no cure. How can a buyer protect himself?

My answer is to visit the farm where the boar was raised and make like Sherlock Holmes. Looking over the farm is the best test I know for detecting diseases. A clean, well run farm is reassuring to the buyer, but look for signs of disease even so. Erysipelas tends to wall itself off in the joints, so look for limping and stiffness in sows and older boars as an indication and beware the herd with pigs missing ears or tails which is another strong sign of erysipelas. Enteritis, sometimes called necro, is associated with a lot of runts, long-haired, and scouring young pigs and a violent form can be detected by bloody manure and

diarrhea. Crooked swollen noses on any of the hogs would drive me away for I have a healthy fear of Atrophic Rhinitis —and I wouldn't accept the explanation that it was just a touch of bull nose either. Small sized litters and small, weak, or dead pigs might be an indication of Brucellosis, but I'd still insist on a herd test even if there were no such symptoms. Silly as it may sound, I'd also keep my eye peeled for dead pigs and I've seen dead ones which had quite obviously been left in the lot for several days.

What'll He Cost?

How much should a good boar cost? It depends on how badly you want that particular boar and how many other people want him too. It may depend on the rareness of the qualities he has, or on the season or on how well or poorly the owner is doing. If the boar happens to be tops in just about every respect the owner isn't going to base his price on the current fat hog market—he'll ask every penny the traffic will bear. Most commercial breeders, however, do relate their prices to the fat hog market. Their prices will run around one and a half times what he would bring at the stock yards. The highest prices, of course, are paid early in the Fall when the smart buyer is out looking for a boar which will breed his sows for early Spring pigs which will give butcher hogs on the good market in late Summer. These boars are more expensive, but the man who shops around until late autumn

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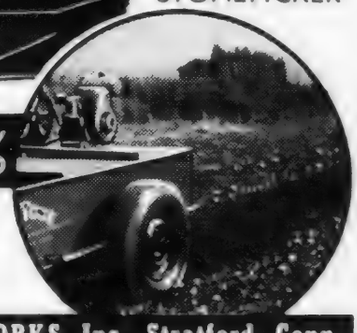

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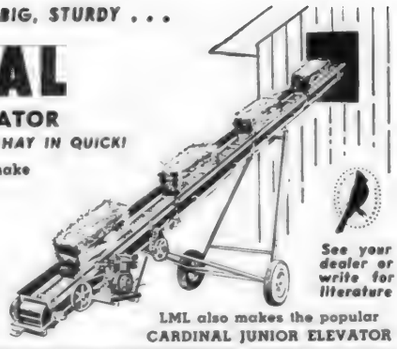

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CITY_____ STATE_____

to get a cheap boar gets the pick of the undesirables. In addition he gets his sows bred late to produce pigs which will be ready for the low market. There's one time when a penny saved just doesn't add up to a penny earned. Really good boars from healthy, disease-free herds are worth a good price. After all why pour good expensive feed into an animal whose breeding you know is bad?

One way we found to trade time for money was to buy four good weanling boar pigs for less than we'd pay for a mature boar. We would then raise them and take our pick of the four when they were eight or nine months old. The three we sold were staggy, but they paid for the feed and trouble.

Before you bring your boar home you should be prepared to keep him in quarantine for at least 30 days. That means he should have a pen or paddock by himself, apart from the rest of the herd. The quarters should be disinfected and clean with plenty of fresh water and feed available. When you're sure he isn't carrying a disease, bring him out and put him to work. You'll soon know what kind of a boar hunter you are.

THE AUTHOR: Since Al Haller was graduated from the University of Wisconsin's College of Agriculture—where he was the Big-10 pole vault champion—he has been managing farms. He has managed average-size general farms, big farms, and pig hatcheries. At present he is manager of the big Weix Farms which specialize in pure-bred Holsteins and boast of a string of more than 50 cows in their herd, all with better than 500-pound butterfat records.

ROCK PHOSPHATE

(*Continued from page* 43)

around a hundred tons of it a year for the past twelve years, spread over the field with a lime truck spreader at up to a ton an acre. Then I broadcast the sweet clover seed and let the cattle tramp it in. We put on the rock phosphate in the fall and seeded in February. In March we took the cattle off and let it grow up in clover. The first year we had a stand of sweet clover you could hide a cow in if you let cows on the field, which we didn't. The next year the bluegrass came in so thick it smothered out the sweet clover.

"We are in a limestone area here—if you look along the edges of the old rock turnpike you'll see the clover is greener and more vigorous where the dust from the limestone rock of the road has settled—and we've limed our fields to the point where they have a pH of about 6, but we still feel that we get plenty of phosphorus. We figure that around three per cent of the phosphorous is made available to the plants each year.

"I realize that every farmer wouldn't want to follow our program because of the expense, but building up a farm isn't normal farming—you have to put a lot more into the soil than you take out. That is why we like rock phosphate, you can put on a heavy application and know that it will be there when you need it. Right now we figure that we've about a twenty-five year supply of phosphate in our soil. In the beginning we bought rock phosphate by the carload and put the stuff

on with a hired lime spreader, now we buy it bagged for easier handling and put it on with our own farm lime spreader.

"We also put on rock phosphate with the manure," Dr. Asbury said. "Twice a week we spread rock phosphate in the horse stalls and over the feed lot. We figure that it cuts down the smell, balances and conserves the nitrogen, and starts the process of decay which makes the new manure into old manure faster."

Balanced Management in Missouri

In Missouri, which is the second heaviest user of rock phosphate, the farmers use heavy applications and they don't spare the horses in plowing it down deep into the acid layers of the soil. Then they apply plenty of superphosphate, nitrogen, and potash as a mixed fertilizer. That's what the "Show Me" boys call balanced soil management. And they are ready to show you that it works. I visited some of them last summer and was startled at the returns they were able to show in their account book. That was right down in the Ozarks. Some of them actually felt guilty about not having covered their whole farm with rock phosphate, but, they explained, they were not able to get it. Cost was never given as an alibi for they figure that the soil management program pays, even when you have to borrow the money to put it across.

Phosphate Will Only Supply Phosphorus

The success of rock phosphate as a soil builder doesn't mean that it will take the place of other plant foods. As a matter of fact, this has caused some disappointment and unwarranted criticism of it. Neither rock phosphate nor superphosphate will take the place of potash or nitrogen no matter how heavily it is applied. And a heavy application of phosphate will not produce a big crop if one of the other foods is in short supply.

In Illinois, as in most grain growing areas, the limiting factors in production are poor physical structure, a shortage of

RESULTS OF A SOIL TEST show how much phosphorus the soil will make available to the crop. If the soil won't fill the crop needs, the farmer will have to.

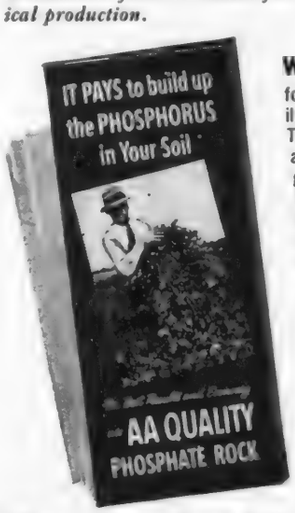
View of Pierce, Florida, The American Agricultural Chemical Company's phosphate-mining headquarters, where phosphate rock is processed for shipment. (Right) Giant draglines removing overburden and mining pebble phosphate rock, source of the vital element, Phosphorus, so essential for good crop yields.

Build up the PHOSPHORUS in your soil

PHOSPHORUS is rightly called the Key to life. Growth, life itself, is impossible without it—yet, phosphorus is the one element most generally deficient in soils.

To sustain healthy growth and good crop yields, it is essential to maintain an adequate supply of phosphorus in the soil, in forms which growing crops can take up as needed.

The American Agricultural Chemical Co., one of the world's largest miners of Phosphate Rock and producers of Superphosphate and Mixed Fertilizers, offers farmers the phosphorus so essential for good farm crops, in whatever form is needed for most economical production.



WRITE TODAY for free copy of illustrated booklet. Tells where, when, and how to apply ground Phosphate Rock, with reports of typical results. Write nearest office, below.

Farmers often ask, "What kind of fertilizer should I use for my crops? . . . When should I use Ground Phosphate Rock, Superphosphate, or Complete Fertilizer?" The answer depends on the soil of the individual farm and its plant-food levels, in relation to the plant-food needs of the crops to be grown.

For best yields, farm experience shows that Superphosphate and Complete Fertilizers have a part in an economical fertilizer program on all farms. Equally true, more and more farmers are also using Ground Phosphate Rock, with very profitable results, in long-range soil-building —*to provide a phosphorus reserve, rather than as a substitute for Superphosphate or Complete Fertilizer.* **Each has its place in a well-balanced fertilizing program . . . and each pays out well on the dollar invested.**

This new booklet (left) will help you fit Ground Phosphate Rock into a profitable fertilizer program. Why not try some AA QUALITY PHOSPHATE ROCK this season, and see the difference it can make in crop yields and quality? Near you is an AGRICO Fertilizer Dealer who will be glad to supply your requirements, in bags or bulk.

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Foundation for Agricultural Research, Inc.
216 Market St., San Francisco, Calif.

phosphate, lack of nitrogen, and inadequate water. Limestone and rock phosphate have been used to do away with these limiting factors. How? By applying them not to the grain crop but to the legume and grass in the rotation in large enough quantities to insure immediate response and maximum growth. The legumes supply the soil with nitrogen and, together with the grasses, add active organic matter which improves the physical structure of the soil and increases its water holding capacity.

PMA Helps Foot the Bill

Because of this way rock phosphate has with grasses and legumes, it has proved to be a valuable tool in soil conservation. In many parts of the country it is on the recommended list of conservation practices for which the Production and Marketing Administration will contribute to the tune of about half of the cost. This is true of some of the hilly counties in northern Kentucky. Frank Harris who is in soil conservation work in Campbell County said, "We've got some pretty hilly country here—no hillier really than across the river in Ohio and Indiana, it's just that the glacier those folks had a few thousand years ago brought the bottoms of their valleys closer to the top of their hills—and we have a problem holding the soil onto the slopes. We find that rock phosphate is a real help in getting a good stand of grass and that a ton of raw rock will prolong the life of an alfalfa pasture by six years.

It Helps Hold the Hills

"On land that has a lot of poverty grass—what is sometimes called moonshine grass—or broomsedge like that stretch over there," he said, pointing to a sloping tract which was blotched with the rusty red patches of broomsedge, "we know, even before we make a soil test, that it will need phosphorous. And as soon as we put on the rock phosphate the good grasses and legumes will crowd out these weeds. We have some trouble convincing farmers around here that they should put on as much as a ton an acre when they can see that it has almost twice as much phosphoric acid as the

MOUNTAINS OF ROCK PHOSPHATE are built around a giant crane at the Florida plant of one of the large producers.

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The* MIDGET 1½" *Lightweight

For farm uses too numerous to list! Pumps 400 times its weight of water per hour at average heads. Primes in 75 sec. at 25 ft. suct. lift. Has maximum lift of 30 ft. (Sea level). Weighs only 62 lbs.

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The Midget 1½"	— wgt. 62 lbs.	—	5,500 G.P.H.
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superphosphate they use on their tobacco beds—they claim it'll burn up their crops—and then we have trouble all over again when they use it and are disappointed in the response as compared to super. It's only after they've used rock phosphate for a few years that they realize they are getting fertility over a long period and don't feel gypped."

Cost

The price of the rock phosphate to the farmer will depend on the distance between his farm and the source of supply, the amount he buys, whether he buys it loose or in bags, and how he spreads it on his land. In most parts of the country the shipping charge will run higher than the cost of the material. Rock phosphate which sells in Florida for $6.25 a ton wholesale will have another $8.74 freight cost hung on it by the time it reaches Indianapolis. The cost of retailing the material will add at least another $2.50 a ton. Spreading the material is another variable in cost. The expensive way is to spread it in small quantities with a farm lime spreader as compared to using the big truck spreaders which meter out the pulverized rock in quantities ranging from 200 pounds to two tons to the acre at a cost of $2.00 to $2.50 a ton in most parts of the country.

In figuring the cost of application, the lasting quality of rock phosphate must be taken into consideration. Laid down once in a rotation, rock phosphate will still have plenty of reserve plant food at the end of four or five years. In this way each application of the material is taking care of current needs and is also putting a deposit in the bank for the future when an emergency such as a war or a depression might make it difficult to fertilize. An example of this lasting quality was shown on a demonstration plot in Urbana, Illinois, where 1500 pounds of rock phosphate per acre were applied in 1935 on land which was continually cropped without the addition of any other fertilizer except limestone until 1949. At the end of these 15 years the gross returns over limestone amounted to $129.67 an acre or $8.65 for each dollar invested. In the same experiment an equal amount of money spent for superphosphate returned only $4.90 per dollar invested during the same period.

This is the kind of return which makes us feel here in Illinois that rock phosphate is a good investment and that it will make a good investment in any other part of the country where there is a phosphorous deficiency, particularly in the acid soils of the South.

THE AUTHOR: A. L. Lang, who is now a Professor of Agronomy at the University of Illinois, began learning about rock phosphate from the late Cyril G. Hopkins under whom he did his undergraduate work at Illinois. After doing post-graduate work at Cornell, he returned to Illinois and has been identified with the Illinois system of permanent soil fertility. He has also done work on hybrid corn and its relationship to soil fertility.

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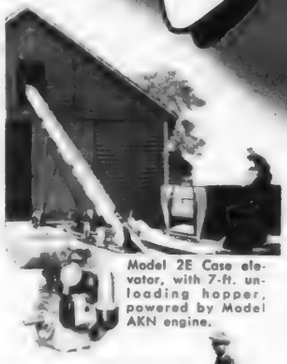
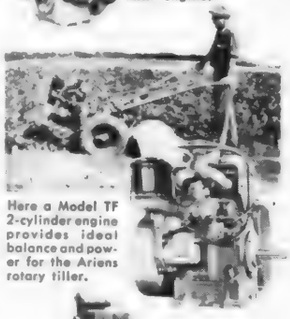
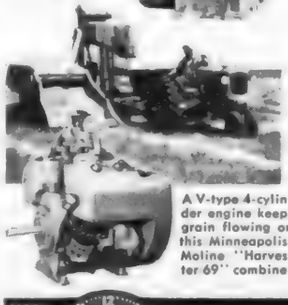

Model 2E Case elevator, with 7-ft. unloading hopper, powered by Model AKN engine.


Here a Model TF 2-cylinder engine provides ideal balance and power for the Ariens rotary tiller.


A V-type 4-cylinder engine keeps grain flowing on this Minneapolis-Moline "Harvester 69" combine.

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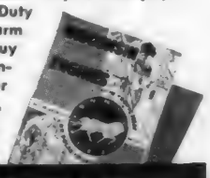

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Scranton, Pa.

WEEDS YOU CAN EAT

(*Continued from page* 85)

You boil them for just a minute and the water gets green: then you pour it off and put them in the cooking pot. Sometimes, if they are big plants, I scald them again before I put them in with the other greens.

"You cook them in water with bacon drippings or bacon or hog jowl with one pound of greens to a quart of water. If you use salt-cured bacon or jowl you don't need no salt, else-wise use a half-teaspoonful to the quart of water. Don't try to use butter in cooking them —it isn't a stout enough grease—and you don't need butter on them to eat if you've cooked them proper with jowl. Some folks put a little lemon on the greens, but I like vinegar better because it's more tart. Only cook the greens until they're tender; if you cook them too long, it takes away the flavor. If Rickie will stop helping me and let me get done here, I'll show you how it's done directly."

Among the greens which Mrs. Givens uses as stand-bys are poke, narrow dock, lamb's quarters, wild lettuce, black mustard, shepherd's purse, dandelion, wild cabbage, and water cress.

Poke: In late summer pokeweed stands eight to ten feet tall, branching like a tree from its heavy woody stem. Its branches are usually covered with loose clusters of purple grapes which the birds love and which make a good wine. The ripe seeds can also be used to make ink. The leaves and stems are valueless at this time, but they do serve as good markers in the spring when you can spot the white skeletons of the old plants and find the tender green stalks pushing up from the old roots. These fat stalks with their leaves furled around them are best when gathered at around six to eight inches tall. Then they can be washed, scalded for a

POKE AT ITS BEST, when it is six to eight inches tall, is better than asparagus. The hollow white skeleton of last year's plant helps locate the new shoots.

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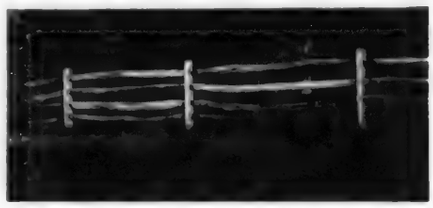

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minute, and cooked whole. Later, when they grow a foot tall, the lower part of the stem is not used—just the leaves and the tip. When gathering poke don't try to cut it off below the ground level, the roots are bitter and, what is more, poisonous. Poke is most often eaten alone, like asparagus, though pleasanter, but it also goes well with other greens.

Narrow-dock: Even when gathered early, narrow dock has a coarser, tougher leaf than most of the other greens. In the spring the thick rosette of leaves seem to fight for space on lawns and in the fields. The leaves are short stemmed with a blade three or four inches long which has a peculiar wavy margin—the plant is sometimes called curly dock because of the wavy leaves.

Lamb's Quarter: The Greeks called this plant Goosefoot because the pointed, toothed, pale bluish-green leaves, which are one to four inches long, resemble the footprint of a goose. The leaves and tip of the plant are gathered in early summer before the plant branches out. They cook down more than most greens so that you should gather about three times as much as you think you will need.

Wild lettuce: The deeply indented leaves of the wild lettuce, which look a little like dandelion leaves, develop prickles when they grow older so they should be gathered before the plant reaches 15 or 18 inches high. This is one of the plants which should be put through one or two scalding waters to leach out the bitterness. Cold, cooked lettuce makes an excellent salad with mayonnaise as do poke and dandelion greens.

Black Mustard: Mustard plasters and hot-dog mustard are made from the seeds of this plant; its leaves make an excellent potherb. The plant is most easily recognized by its bright yellow flowers sprinkled over its branches and by the leaves which are long and slender near the flower heads and wide with deep toothed indentations near the bottom of the plant. Its flowers are yellow, its leaves and stem are green, and its seeds are dark brown, which leaves its name a mystery.

Shepherd's Purse: The base leaves of the shepherd's purse look like an extremely vigorous dandelion plant. From the center of this crown of leaves grows a slender stalk a couple of feet high with leaves shaped something like thin arrowheads. The leaves at the base of the plant are the ones gathered for greens.

Dandelion: Everyone who has ever been off the concrete slab of the city knows the dandelion: not too many, however, know how to convert it into a delicious, powerful amber wine. The leaves are eaten early in the spring before the yellow flowers come. When the plant blooms, it is wine making time. Mrs. Givens makes five gallon lots of the wine with the following recipe: "Pick a peck of the dandelion

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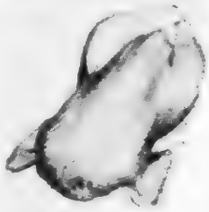

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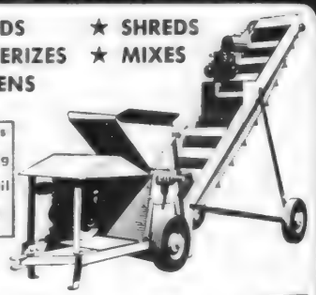

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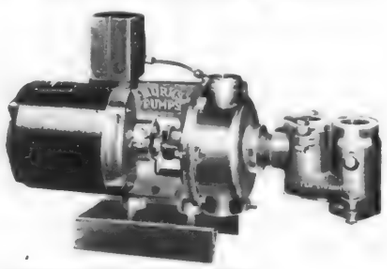

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blooms and put them into a five gallon crock. Pour five pounds of sugar over them in four and a half gallons of boiling water. You let it cool right down to luke-warm so it won't kill the yeast and then add two cakes of yeast crumbled up. Stir the wine every day for fifteen days when it should be through working and then strain it through two cloth strainers. The wine is pale yellow. It is ready to be drunk or bottled for later."

Water Cress: The crisp, tasty water cress should only be gathered by those who know the plant well since there are two important dangers present. Usually where you find water cress, you also find the deadly water hemlock which might possibly be confused with it. The second danger is contamination of the water. It is safest to wash the cress in chlorinated water to make sure that it is clean.

These are only the main greens used in cooking by Mrs. Givens and only a tiny fraction of the edible wild plants described in such authoritative books as *Edible Wild Plants of Eastern North America* by Fernald and Kinsey or *Edible Wild Plants* by Medsger. Here you can find lists of plants for soups and plants for flour, and for tea, and for starchy vegetables, and even for chewing gum. They also tell how to make the most out of such plants as milkweed whose shoots can be eaten as asparagus, the flowers as a green, and the immature pods as a boiled vegetable, and, oh yes, the sap can be dried and chewed as gum. And they give directions on converting the cat-tails that grow along the bank of the pond into a year-round food supply using the short thick shoots from the root stock as a salad and cooked vegetable in the autumn and winter, the peeled young stems in the spring as something to nibble on, the flowering spikes before the pollen comes as a boiled vegetable eaten off the stem like a lolly-pop, and the pollen as a flour for making bread.

Once you get started finding edible greens you will not be limited by the book—only guided by what the Indians and others have found good and warned by the list of poisonous plants. Not listed, for example, is a plant which a Wisconsin pasture expert claims is delicious as a salad—ladino leaves. His cattle tuck away tons of it during the season and he and his family use a pound or two of the fresh leaves served alone with a French dressing or in a mixed green salad. "It is the greatest pasture crop for hogs, cattle, or man that I know about," he says as a testimonial. "I've eaten lots of it and I like it."

The Farm Quarterly is indebted to Dr. Alfred C. Kinsey, one of the authors of Edible Wild Plants of Eastern North America, *for checking the manuscript of this article. As with all of our articles, we sent copies out to experts in the field for checking—we were surprised to find that one of the foremost authorities was Dr. Kinsey who is better known for his work on the gall wasp and still better known for his research on the sex life of the American male.*

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RED-E TRACTOR CO.
RICHFIELD 344, WISCONSIN

COUNTRY AUCTION

(*Continued from page 83*)

had started the engine and was discussing a knock with a group of self-appointed experts.

Promptly at 9:30, Colonel Boone mounted Ike's manure spreader and shouted for attention. "I know I am speaking from the Republican platform," he said, "but I'm not going to make a political speech. Just want to tell you the terms of the sale and something about the fine articles we are going to sell here today."

He sold the smaller pieces first, from the manure spreader, at the rate of four sales a minute. Each object was brought to him and held up so that it could be seen by the crowd. The first sale, a pitchfork whose handle had been polished by twenty-five years wear from Ike's horny hand, was knocked down to the first bidder for 10 cents. Ike stood a distance away so he couldn't hear. He hoped that in an hour the crawling that was going over his skin would stop. The first sale is usually a "bargain," going quickly to warm up the crowd.

Then larger pieces of machinery were sold, the crowd following Colonel Boone from piece to piece.

By noon the livestock had gone and Boone was ready to sell the household goods. The Baptist ladies had been doing a rushing business in coffee, mince pie, hot dogs and soft drinks. Babies cried constantly and there was a long waiting line at the backhouse in the garden.

Standing in the background, Ike and his wife watched their old familiar things pass into new hands and new homes. They spoke little for this was like an invasion of their privacy. When Mrs. Ike saw that her cane bottom rocking chair, the one she got from her mother, was about to be sold, she rescued it and brought it back to where they were standing. "We'll take it with us," she said. "Sure, ma," Ike smiled.

Once a bidder complained that his last bid had not been heard and Colonel Boone put the article up again. It brought 50 cents more than on the first round. Ike had a bad time when a cow brought $25.00 less than he had paid for her a year before.

The clerk listed each article, with the buyer's name, as it was sold. Some paid for their purchases at once; others waited until the end of the sale.

Last of all the farm was sold. For this event there were exhibits of ears of corn and sacks of oats grown last year. Ike was called on to give a few words of testimony to the high yields that the place had always produced. Mrs. Ike told how the well could be called on to do three washing-machine loads every Monday and the cows could still be given all the water they wanted—"even at the end of a dry summer." The buyer turned out to be Jake Clark's boy, Joe. He was backed

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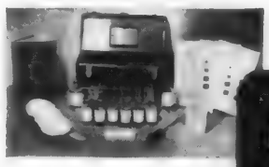

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A RARE OBJECT may turn out to be a collector's item or it may be a useful article in the home, it all depends on your point of view.

up financially by Jake, folks said, and there was no question of the moral support. His bride of last June was all smiles.

Buyers stowed small articles in their cars; some of the livestock was being loaded on trucks, and the young farmer who bought Ike's tractor drove it noisily out of the barnyard. When the last car had gone and the clerks tallied up their books and turned over the cash, it was sundown. For the first time in their lives Ike and his wife had no chores to do. Mrs. Ike sat down in her mother's chair in the bare kitchen, and set her face in a frown to squeeze back the tears. Ike walked slowly out to the barn. Honey, the old Jersey, was in her stall—her new owner said he would come for her in the morning. Ike gave her some hay and broke a half dozen ears of corn into her feed box. She had always been his confident. "Honey," he said, "it's too late to back out now."

Buyers and the Lookers

In addition to those who go to an auction sale to buy, either something they need or something they have no earthly use for provided it is a bargain, there is always a sizable delegation of professional sale attenders, or lookers.

Sale attenders rarely buy anything. They go to sales for the same reasons they go to fires, funerals and the theatre. The professional attenders come early, find easy chairs near the auctioneer, and remain spectators. They are careful to keep out of the bidding, knowing that once caught up they are at the mercy of forces far beyond their control.

Here's an electric pump that makes fueling safer. Operates from an underground tank. Reduces hazards of fuel handling. Delivers gasoline directly to trucks, tractors or other equipment. Pumps 10 gallons a minute. Weather-resisting, baked enamel finish. It's ideal for the modern farm. See your Tokheim dealer or your oil company.

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Each sale is a contest between the auctioneer and the bidder. The odds are against the bidder, for the auctioneer is an older hand. He warms up two bidders, pitting the greed of one against the pride of another. Both may have wanted the article in the early stages of the bidding, but soon the desire for possession gives way to the elemental desire to beat the other fellow, regardless of the value of the article or the cost to themselves. This is pay dirt for the auctioneer. Each bid made in frustration or anger boosts his commission and bolsters the well-known saying that an auction sale is a trap for suckers who pay more than it's worth for a piece of junk they don't need.

A vase bought the week before at the 5 and 10 sells for 80c; a rusty saw sells for more than a new one costs. Auctioneers say a farmer is a sitting duck for a box of old scraps, nuts, bolts, rusty hinges, broken tools, spare parts of old and obsolete machinery. He may have his shed full of boxes bought at other sales or collected himself, but he'll always put in a bid for one more, storing them away like a chipmunk. He's pleased if he finds a good wrench or a new pair of hinges in a blind package, but if he doesn't he is philosophical—"You never know when you'll need a handle for an apple peeler," he says.

Women have a weakness for doilies, grab bags full of cloth remnants advertised as quilting material, and prints in gilt frames of "Rock of Ages," and "The Stag at Bay."

Anything will sell at a country auction, chiefly because the buyer doesn't want the other fellow to have it. Articles which can't be given away sell readily. George Bean, a Connecticut auctioneer, received a few desultory bids for a gadget the use for which he frankly admitted ignorance. When someone in the crowd explained that it was used to extract apples from the throat of a cow, the bidding went up. The farmer who bought it said he had never known a cow to choke on an apple on his farm, and he had no apple trees himself "but it might come in handy some time."

Auctioneers report some amazing sales. J. A. Bissantz, of Williamsburg, Ohio, once sold a corset and singletree (in combination) for 65c. "I sold a beaten up bass fiddle used in the orchestra in Ford's theatre the night Lincoln was shot," he adds. "I've sold cats and false teeth and a tread-mill thresher. I once sold a piano for 25 cents. The only thing I haven't sold is a coffin—but I did sell a tombstone."

The Antiquers

In addition to the local professionals there will be a sprinkling of another breed of attenders, the antiquers. There is no region so remote, but has someone who buys, trades and sells antiques. These will be at the sale and with them buyers from the big cities who spend their summers

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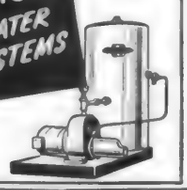

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ALPRODCO, INC., BOX F, Mineral Wells, Texas

traveling from country sale to country sale. They dress like farmers, stand unobstrusively in the fringes of the crowd and edge in their bids. Before the sale starts they have inspected everything carefully and when an article of antique value is put up they swoop down like birds of prey to make a kill.

For the antiquers, the pot of gold is a "sleeper." A sleeper is junk to the owner, but priceless to a collector. It may be a spoon holder which has miraculously escaped the hazards of time while serving its mundane function of holding spoons on the kitchen table; or it may be a rickety old table, bearing several coats of paint, used for many years as a stand for the wash basin on the back porch. The expert antiquer hopes that no one sees what he sees—that the spoon holder is genuine Sandwich and the table is solid cherry put together with wooden pegs by a country craftsman a century ago. He dulls the gleam in his eye and bids 50c for the table. He may buy it for 75c. The nemesis of the antiquer is the local housewife who has been bitten by the antique bug and is refurnishing her home with "pieces she picked up for a song" at sales in the neighborhood. She knows enough to suspect that anything old might be a sleeper, but not enough to be sure. So she bids on everything suspect.

Another type of sleeper is what is known up and down the Wabash valley in Indiana as "Aunt Minnie's Chicken Money." It seems that an early farm family along the Wabash took in Minnie, an orphan girl, to help with the household chores. Minnie wasn't paid a wage, but she was permitted to sell a few eggs or a hen or an orphan lamb now and then. She was frugal, and her wants were few. She wore the cast-off clothing of the family; once a year she went on a spending spree at the county fair, blowing 10 cents for admission and 15 cents for three bags of peanuts. Being shy and a little tetched in the head she had no boy friends, and never married. As she grew old she kept to her room under the kitchen eaves, spending her days darning and mending shirts. Everybody called her Aunt Minnie. When the children and grandchildren came for a visit they slipped her a dollar or gave her a pair of cast off earrings which she never wore.

.There was a casual curiosity among the family about what Aunt Minnie did with her money, but when she died none could be found.

Soon after her death the old folks decided to leave the farm. Everything went on the auction block, including the pathetic contents of Aunt Minnie's room.

Mrs. Cyrus Gilpenny bought Aunt Minnie's sewing basket, chock full of a half century's collection of bits of yarn, for 65 cents. When she got it home she found a wadded bill at the center of each scrap of yarn—$800.00 in all. The family sued Mrs. Gilpenny, but the courts held

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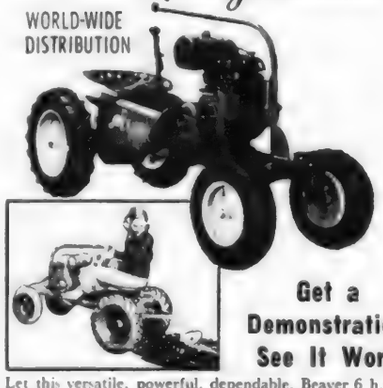

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Let this versatile, powerful, dependable, Beaver 6 h.p. Riding Tractor do your hard work! For just a few cents an hour operating cost, it does jobs other small tractors can't tackle. Complete line of implements to plow, harrow, cultivate, rake, grade, roll, mow lawns and fields, plow snow, saw wood, generate electricity, haul heavy loads, etc. Thousands of enthusiastic owners. *See your dealer or write for literature and dealer's name.*

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1465 Stratford Ave. Straford, Conn.

CITY BUYERS look at the paint and chrome; farmers get down and look under.

she had made a bona fide purchase of the basket "and its contents."

To this day, any sewing basket full of scraps brings a high price at country sales along the Wabash.

The Auctioneer

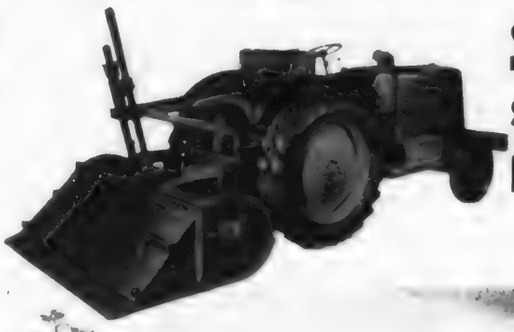
There are 50,000 auctioneers in this country including specialists who auction jewelry, stamps, works of art, livestock, tobacco and real estate. The country auctioneer is the most versatile of the lot since he may sell, on any one day, everything within the range of human possessions. The good auctioneer is expected to know something about everything he sells—he must know values and prices and the relationships between what an article will bring at a sale, what it cost as new, and what its real value is.

He has a delicate feeling for the temper of a sale crowd, he knows how to warm it up into a buying mood, and how to butter up a reluctant bidder. His tongue must be loose at both ends and he must have a ready wit and a stock pile of jokes.

He must watch that he does not overreach himself, for if any article is not as he represents it, the buyer may legally demand his money back. It is not difficult to know what an auctioneer means when he says a pitcher has a nick out of the spout but will hold water. It is when he generalizes with such claims as "with a little repair it will be as good as new" that both he and the buyer are treading on thin ice.

A work of art described as "genuine" must be genuine. A "genuine" Currier and Ives print can not be a reproduction. An antique must be an antique. This term, generally applied to something old in furniture, china, glass, or objects of art, is a constant pain in the auctioneer's neck. The increasing numbers of antique buyers at country sales have made most auctioneers wary of the word. Ask one what he means by antique and he usually has pressing business elsewhere. Pin him down and he'll say, "Something that's old."

They're clearing 20,000 acres of heavy brush with TWO SEAMAN SELF-PROPELLED ROTARY TILLERS



In the tidewater area of North Carolina they're reclaiming 20,000 acres of waste brush land and converting it to lush, profitable pasture. And two Seaman Self-Propelled Tillers are doing the job at a small fraction of what the cost would be with any other equipment.

The area is muckland (hard to work with anything but a Seaman) — thickly overgrown with Bayberry, Myrtle, Broom Sedge, Smilax and various types of pine.

First, they operate the two Seaman Tillers with the hood open. This throws milled, chopped and pulverized brush and root systems to the surface. A second pass with the Tillers — this time with the hood down, completely buries the trash and leaves a fine bed for grass seeding. They do nearly 40 acres a day with each machine in the second operation.

They're planting fescue, ladino clover, sudan grass and soy beans behind the Seaman Self-Propelled Tillers — and they're getting magnificent stands.

Your own pasture and farming operations may not involve 20,000 acres — but the Seaman Rotary Tiller will solve virtually any tillage problem you may have — no matter how different . . . And it will do the job faster, with higher daily production — and at a cost that will net you a very handsome profit.

Plan *now* to improve your soil, get bigger, more profitable yields — with a Seaman Rotary Tiller.

ROTARY TILLERS AT THE LOWEST INVESTMENT

The Seaman Tillit — built for tractors of 23 H.P. — and up. It's a farm-size tiller so maneuverable you can use it in your garden, too. 3 ft. tillage width.

This FREE booklet *"Benefits of Rotary Tillage"* is a comprehensive description of rotary tillage practices. Describes land clearing, pasture renovation, seed-bed preparation and many other valuable applications. Write for your copy — today.

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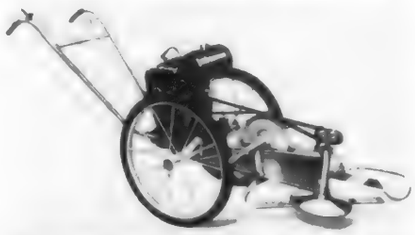
Cutting Weeds
is good farming



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This is his personal sixty-four dollar answer. Among antique dealers it is generally understood that a piece of furniture must be at least 100 years old to be an antique. This leads to the inevitable conclusion that articles which were not antique yesterday become antique today.

In spite of pressure from dealers to pin down the exact definition of the word, auctioneers feel free to apply it to anything which looks old and is not made today. This rules out reproductions of genuine antiques, which must be sold as reproductions.

Another antique problem to the auctioneer is the client who is sure Aunt Sophie's monstrosity of a sideboard is worth a fortune because some well-meaning if uninformed collector told her so.

An owner very often wants to protect himself against excessive loss from a low bid. Whether or not an owner may bid himself or have someone bid for him is at the discretion of the auctioneer. Many permit one bid only from the owner. If that is topped he must drop out. If the article is knocked down to him he must pay the auctioneer commission on the sale.

The Royal Family

The royal family of the auctioneers clan are those who have graduated from the Reppert School of Auctioneering at Decatur, Indiana. The school was founded by the late Colonel Fred Reppert, one of the best known livestock auctioneers of all time. For $200.00 the School offers a three-weeks course (with room and board or free camping space), guaranteed to make an auctioneer out of an aspirant or his money refunded. Students are taught diction, voice culture, laws and regulations governing auctions, practical psychology, the trick of the chant, how to overcome stage fright, and salesmanship.

The patter with which an auctioneer interlards his calling of bids, commonly called chant, filler or mumbo jumbo, is surprisingly easy to learn once you get the hang of it. Reppert starts the student with some such simple formula as "mama mama mama." "Papa papa papa" will do just as well. Most auctioneers have their own particular brand of mumbo jumbo.

Bissantz likes "Bob bob bob," "Now say, now say." His patter goes something like this. "I gotta dollarn quar, dollarn quar—do I hear dollarn haf bob, dollarn haf bob, now dollarn sentyfi, now say, now say." The more difficult mumbo jumbo of the tobacco auctioneer is simply various grunts, wheezes, squeals and gargles used as designations for fractional parts of cents. Reppert's students are advised to practice alone with their livestock.

Auctioneers are traditionally addressed as Colonel. No one knows where this originated. A plausible explanation is that in the old days many auctioneers affected the frock coat, wide brim Panama hat, string tie and cane of a Kentucky colonel. The cane and hat are today the trademarks of the stock auctioneer. The Reppert School's handsome diploma makes no mention of a title.

Commissions paid to auctioneers vary widely, depending on the class of merchandise sold, amount of sale, and the locality. Some sell real estate for as low as 1½%, but real estate dealers have generally succeeded in pushing this up to 5%, their usual commission. Household goods bring 5% to 10%. Rare books bring as high a 40% and works of art also a high percentage. Auctioneers will often take a country sale—real estate, livestock, machinery, household goods and crops at a "lung power" flat rate because of the large total. Commissions are usually higher at auction barns, where articles left on consignment are sold. The auctioneer provides clerks who keep book on the sale and collect the money, but the owner pays them, usually a flat daily wage. The auctioneer is responsible for collections. When the sale is over he collects his commission at once.

The auctioneers have an association, The National Auctioneers Association. The president is Clyde Wilson of Marion, Ohio. The 1953 convention of the association will be held at Columbus, Ohio, during July, in case you want to attend.

FREEZER HERESIES

(*Continued from page* 81)

One time I went haywire on bananas. I saw a whole counterful of them fading in the heat of a certain summer day and, before I knew it, had made a dicker and was on my way home with the back seat of the car exhaling billowing clouds of overripe banana aroma, to my husband's horror. I got out the electric mixer, squeezed the juice of four lemons into the bowl and set the beaters at a slow whipping speed. Then I proceeded to cut up and drop into the bowl all the banana that was any good, adding more lemon juice as I worked according to taste and any tendency to discolor. When I finished I had a huge bowl of banana puree. And all through the summer we had plenty of banana ice cream from it, banana gelatin desserts and whips, banana topping for gingerbread, banana cake frosting and banana milk shakes.

Aspirate the Air

I feel that The Books do not emphasize enough the importance of getting as much air as possible out of packages. That is why I emphatically recommend packaging vegetables in plastic bags instead of in those cellophane bags which are contained in paper boxes. You cannot get as much air out as you can when using a plastic bag. If, for instance, we could aspirate every speck of air from a package I wonder if we would need to blanch at all.

Perhaps so, but in the first place there is not on the market any practical, simple device for withdrawing air. Large scale processors of poultry have the great advantage of a fine, positive professional aspirator put out by Dewey and Almy Chemical Company to be used with their famous Cryovac and Cryorap bags, but this is both too large and too expensive for the housewife. They also have a smaller water-power operated vacuumizer, but I tried this and found it hard to adjust and too dependent upon forceful waterflow.

So I invented my own, and use it successfully and find it makes an enormous difference in the flavor and keeping qualities of whatever I put into the freezer. Until someone takes me up on my device, though, you will have to go on holding the bag to your mouth and breathing in as hard as you can to pull out as much air as you can.

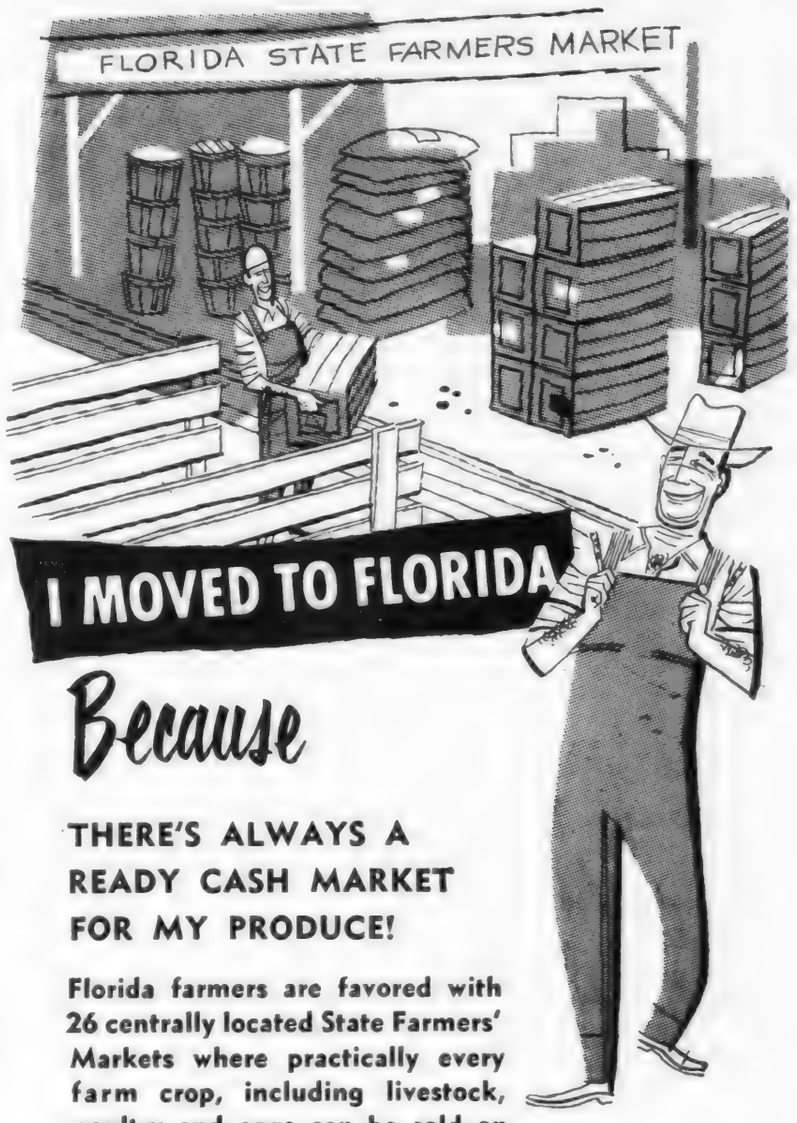
The Question of Refreezing

Finally, the difficult and delicate matter of to refreeze or not to refreeze.

The Books have laid down a blanket, rigid rule on this—in one word, NEVER.

I know for a fact that not only I, but many people, refreeze almost all and any foods safely.

There had to be such a rule, however, because people had to be scared stiff and warned not to allow anything to defrost



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and then refreeze it. This entire freezing business was in swaddling clothes and we had to be told not to loosen the wrapping even a little for fear we would kill the infant by too much exposure.

As an overall precaution, refreezing is not recommended. As a matter of judgment and common sense it is not only possible, but entirely safe if certain precautions are observed.

I ran into this early when I discovered the great, the overwhelming, advantages of buying fruit from certain places where the fresh fruit was rigidly chosen and processed, with sugar in proper proportion, and frozen in 30 pound tins. These sell for infinitely less than the same amount of fruit could be bought for in the stores in small packs.

Before I had a freezer I bought cherries, peaches and apples from B. J. Case Farms of Sodus, New York. I canned the cherries and peaches and kept the can of apples in the refrigerator for awhile using fresh for pies, and desserts and even for eating. After I had a freezer I bought not only these but also great, rich Bing cherries in juice, wonderful fresh plums halved and in syrup, raspberries and delightful strawberries. Beautiful, perfect fruit. I merely unfroze the contents of the big cans, repacked in quart Thermorex containers, or Stor-Paks plastic containers if I planned to hold the fruit very long, and froze once more.

Then I made pies from the fruit, which meant thawing again, and freezing the pies, and thawing once more to use.

Count up those thawings. Right! And never once have I had even a hint of trouble.

But, I never allowed the fruit to get warm. When shipped, the cans almost always arrive with the contents unfrozen: however, the fruit is sterile when packed. Have ready your containers, open the cans, dip out with a scalded spoon, top, label, and refreeze in the quick freeze part of your freezer if you have it. Forget about this bugaboo of danger.

I certainly would never, however, let the unfrozen fruit get warm, or stay long opened, even in the refrigerator, and then refreeze. Once you open the can, package. If you do not intend to refreeze or can, take some out to use, cover the can and keep in the refrigerator. If you sterilize your spoon, the fruit will keep a surprising length of time without spoiling, and before it gives even a hint of that, you can cook it up and can or preserve. But it is better, nicer and easier to freeze.

A far trickier proposition to handle this way is fish.

To get better and fresher fish than we can from local markets and to beat the high cost of you-know what, I now buy all fish from a company in Wisconsin in amounts of from 50 to 300 pounds at a time. The advantages of this are not only marvelous fish, but infinite and fascinating variety, and an average price of around 30

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Corn States Hybrid Service
Farm Products Division A
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to 40 cents a pound even for fillets! In winter, my shipments are generally completely frozen when they arrive. In summer, although the company packs with dry ice and insulates, usually some of the shipment is partially thawed when it comes.

Fish Should Be Frosty

I always refreeze with no qualms whatsoever, just so there are still some frost crystals left in the fish. Sometimes part of the fish will be completely frozen, some half frozen, and a little of it with no ice in it at all, but icy-cold. Knowing how long this has been on the way, knowing that it was frozen probably up to the day of arrival, I repackage if necessary, or simply put the boxes into the quick-freeze part of the freezer. Whatever is entirely defrosted, I use at once without refreezing.

In only one case did I reject a shipment because it arrived unfrozen. This was once in summer when the box for some reason was delayed enroute. (They always notify when the box is shipped so one can be sure of this time-element.) The fish came this once very cold, but perfectly limp without a bit of frost in it. In this case the fish looked and smelled all right, but I was taking no chances. I rejected the shipment, notified the express to that effect, filled in the proper paper to enable the company to obtain damages, and then the shippers sent me an entire new shipment of fish to replace the damaged one.

This is the story on refreezing. The rule I go by, and which I have been assured is sound, is simply this: If, on breaking a food apart, you find ice crystals still in it, refreeze immediately and it is safe. I have been buying fish in these institutional packs for four years now, and have followed this rule with no trouble whatever.

So go ahead and pioneer. Nobody knows the whole story, and assuredly nobody knows all the answers. Some readers of my book have written me of things I did not think of myself, and which, as soon as I have time to test, I shall probably find as time-and-energy saving as any of my own. More and more I am discovering that it is only by trying new things and making mistakes now and then that one profits—by the very process of making mistakes you poke your way along a path nobody has found before.

And do you mind telling me about your new paths, when you find them? It is high time we fixed up our own set of Books, with more new rules and heresies-made-proper, than I have written to date.

THE AUTHOR: Marie Armstrong Essipoff is a prolific writer on a wide variety of subjects. Two books, *Making the Most of Your Food Freezer*, and *Making the Most of Your Cooking Time*, show her in her role as farm housewife. But she has other interests. With her husband, Dmitry, she owns a farm near Terryville, New York, where they raise a wide assortment of animals, including milk goats, pigs, and geese. She is particularly partial to Hampshire pigs and is one of the best known breeders of Pilgrim Geese. An article on the Pilgrim Goose was her first contribution to THE FARM QUARTERLY.

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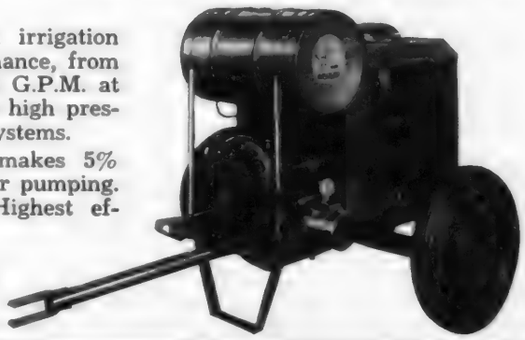
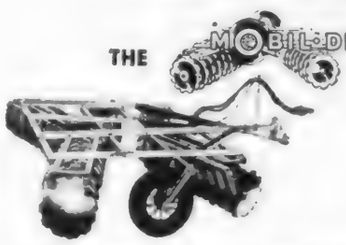


THE MOBIL-DISC



It's fast, flexible, tough . . . slices up corn stalks, haulm the first trip over . . . "Indestructo" bearings carrying a 5-year guarantee . . . wheels that raise and lower hydraulically . . . ideal for all types farming, soil and pasture renovation . . . simple one-piece hitch adjustment . . . comes in 7, 8, 9, 10, 11-foot sizes.

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Keeps front tractor wheels rolling when it's wet and muddy . . . makes your tractor safer and easier to steer. Completely adjustable. Easy to install . . . low in price. WRITE:

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DANUSER DIGGER

UREA

(*Continued from page* 98)

The revolution in farming which started at the end of World War I and now enables the farmer to get 34 per cent more crop from an acre, 53 per cent more production from the average animal unit, and 126 per cent more output per man-hour of work, is just getting started.

Urea is one of many new synthetic feeds we can expect to see on our feed bag "Ingredients" tag as we work out ways to push up food production in the years ahead.

KILL THAT BUG

(*Continued from page* 47)

dusts can be prepared more quickly and the machinery for application is lighter and less cumbersome. But it is also generally more expensive than spraying and it just doesn't do the job it should in controlling some pests. An exception to this is the use of BHC as a dust for spittlebug control. When applied early in the growth of the hay crop it is very effective and economical.

For spraying, the insecticide must be in the form of an emulsion concentrate or a wettable powder. An emulsion, as you know, is a suspension of fine globules of a liquid in a liquid. So, in an emulsion concentrate the insecticide is put into solution with a solvent and an emulsifier is added. This concentrate can then be added to the proper amount of water to prepare a spray of the desired strength. The wettable powder is simply the powdered insecticide with a wetting agent added to make it mix with water.

The emulsion concentrates may be used very satisfactorily in the low-pressure, low-volume outfits that farmers commonly call weed sprayers. Wettable powders, however, will clog the nozzles in these weed sprayers and should be used only in high-pressure machines.

The important factor in applying any insecticide is the use of the proper amount of the actual chemical per acre, no matter what formulation may be used or how much it is diluted. The table prepared by the Department of Entomology, Purdue University, and reproduced on page 46, is a handy guide in determining how much of any particular formulation need be applied to obtain a given amount of the insecticide per acre. For instance, if it is stated that one and a half pounds of toxaphene per acre are needed to control a pest, reference to the table will show that this calls for three pints of 40 per cent emulsion concentrate or six pounds of 25 per cent wettable powder.

Grasshoppers

After the spittlebugs have been disposed of, the next invasion can be expected from

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the grasshopper. They eat heartily of the best plants. Cats and dogs know this high-protein bug and will eat them all day long.

Before they depart this life in the late summer they lay their eggs in the soil in and around meadows and pastures. The eggs hatch in spring and the wingless young begin a summer of feasting.

BHC, lindane and toxaphene will stop them cold, but chlordane is currently looked upon as the leading grasshopper killer. Chlordane is another of the organic insecticides and like BHC works as a contact poison and a stomach poison. One to one and a half pounds per acre are generally used for 'hopper control.

Parathion, an organic phosphate insecticide, is another that is sure death to grasshoppers. In fact, it will get everything that DDT will and a good many more besides. Were it not for the fact that it is extremely toxic to humans, it would probably be our leading insecticide today.

Out in Iowa they have a neat way of "throwing the book" at the grasshoppers without being bothered by the bogey of residue accumulations. When cutting hay they leave a strip uncut in the center of the field. They spray this and the edges of the field. The 'hoppers rush in to feast and find they have been booby-trapped.

Alfalfa Weevil

In the alfalfa fields of the West the most important insect enemy is the alfalfa weevil. This tiny snout beetle overwinters in any kind of leaves, weeds and trash and some even sojourn in hay in the comfort of the barn. Early in the spring they begin laying their eggs; and a thorough job they do, each female sealing six to eight hundred in the stems of the alfalfa plants. The eggs hatch in about ten days and the larvae spend the next three or four days feeding inside their hatchery. Eating their way to the outside, they really go into action working on the leaf buds at the tips of the plants, then take on the leaves until nothing is left but the leaf veins and wood fibers of the plants. Severe infestations

THESE TWO samples of alfalfa were taken from a Pennsylvania field in the summer of 1952. An infestation of potato leafhoppers on second-growth alfalfa caused the stunting of growth, yellowing of the leaves of the sample on the right. The healthy looking sample on the left was sprayed once with a toxaphene emulsion formulation.

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says GEORGE UNKRICH of Mount Pleasant, Iowa

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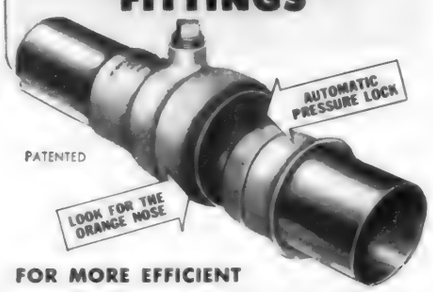

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give a field a bleached-out appearance that, from a distance, might be mistaken for severe frost damage.

After about three weeks of this utterly destructive activity during which they may have ruined the entire first crop, the larvae crawl to the ground and spin their cocoons from which the adults emerge some ten days later to feed on subsequent crops the rest of the summer.

A parasitic insect with a name out of all proportion to its size—*Bathyplectes curculionis*—was imported from Europe 40 years ago to help destroy the weevil larvae. In some spots the little fellow has done a remarkably effective job, but he needs a lot of help. The elimination of wintering places for the adults is recommended as a first step in control of the weevil. Cutting the first crop as soon as the larvae have checked its growth and removing it promptly helps to starve the pests.

Dieldrin and chlordane are recommended for application in the very early spring to get the adults. They should be applied when the alfalfa isn't more than a couple of inches tall. A quarter of a pound of dieldrin or one and a half to two pounds of chlordane are the suggested per acre application.

Later, in May or June, another treatment may be needed to get the larvae. This time a choice may be made between two pounds of calcium arsenate, one to two pounds of methoxychlor or a quarter of a pound of parathion dusted or sprayed on each infested acre. No hay should be cut for a period of two weeks after these applications.

If a seed crop is in prospect, the early application of dieldrin or chlordane should be made as above, then, when the bud stage is reached, DDT should be dusted on at the rate of two pounds or sprayed at the rate of one and a half pounds of actual DDT per acre.

Sweet Clover Weevil

For as long as even the oldest residents can remember, the common Mayfly has been known along the south shore of Lake Erie, from whose waters it comes, as the Canadian Soldier. And while the great masses of these flies that accumulate on buildings and walks and roadways create a general nuisance in the latter days of May and early June, their intentions are entirely peaceful and they do no damage.

Such is not the case, though, with a real invader from the north that has now spread throughout the Midwest to inflict serious damage on sweet clover stands. This is the Sweet Clover Weevil, first seen around Montreal almost thirty years ago and an American invader since the early 'forties.

This weevil is a snout beetle that overwinters in the adult stage. It comes out of hibernation the first warm days of March and starts feeding on stands of old

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sweet clover then transfers its attack to the new seedlings as soon as they make their appearance. It lays its eggs under the soil at the base of the young plants and after the larvae hatch they spend two months or so feeding on the rootlets, but without any apparent damage to the plants. During August, the new adults emerge and prey on the sweet clover for the rest of the summer and fall until cold weather sets it. While they prefer sweet clover they don't mind feasting on alfalfa when sweet clover stands are limited.

The Indiana Experiment Station recommends DDT applied at the rate of two pounds of the actual material per acre. Iowa says one pound per acre will do the job. While application either by airplane dusting or by spraying with a low gallonage, low pressure, weed-type sprayer is effective, the most efficient treatment has been found to be application in mixture with a superphosphate or phosphate-potash fertilizer such as 0-20-0 or 0-12-12. A two pound application calls for mixing 4 pounds of 50% DDT or 20 pounds of 10% DDT with the fertilizer to be applied to one acre. The mixing must be thorough so that there will be an even application of the insecticide. The fertilizer, of course, must be spread as a top dressing so that the DDT is scattered over the field all ready to stop the weevils as soon as they show up.

Cultural controls are also helpful. To prevent the weevils from migrating from old clover it is best to avoid new seedings of sweet clover next to a second year stand.

Salt Marsh Caterpillar

Almost as common as the grasshopper is the woolly salt marsh caterpillar that can be seen hustling along across road or field on warm autumn days like a busy little fur-coated comedian. What he (or she) is looking for is a spot to spin a cocoon and spend the winter.

In some sections these woolies are no problem at all. In other areas, though, they prey on practically every garden and field crop. In the spring the spotted moths come out of their cocoons and the females

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deposit their eggs on plants among which alfalfa and the clovers are very popular. The little dark brown caterpillars hatch out in four or five days and feed on the leaves of the plants, leaving little or nothing behind them, finally dropping to the ground with a full stomach to spin their cocoons. There are from one to three generations a year, depending upon location and climate.

Methoxychlor is the currently recommended control. For rates and time of application check your local entomologists.

Leafhoppers

The potato leafhopper is another pest that is seen everywhere.

The female lays her eggs in the stems, buds and leaves of alfalfa and other plants in May. These hatch into wingless nymphs in about a week. The nymphs grow to adults without passing through a pupal stage, continually sucking the juice from their host plants.

DDT will very effectively check a leafhopper invasion. It is suggested that local authorities be consulted as to concentrations and rates. And, remember, crops treated with DDT should not be fed to stock producing milk or meat.

C. R. Weaver, assistant entomologist at the Ohio Agricultural Experiment Station, says: "Methoxychlor emulsifiable concentrate at a half pound per acre will do an excellent job of controlling alfalfa leafhoppers. This material can be recommended without fear of residue hazards."

Stink Bugs

The stink bug—whose name is derived from the fact that he does—is one of several species, the larger one pictured in our rogue's gallery being commonly known as the conchuela or "little shell" in the Southwest, where he has become notorious as a pest of alfalfa and a real stopper to any ideas of seed production. By sucking the juice of the plant he stunts and deforms it and shrivels and discolors the seed pods by a similar attack.

Control of the stink bug is the same as that recommended for the lygus bug below.

Lygus Bugs

In the western states, the lygus bugs have gained the reputation of being among the most important of all the insects that damage alfalfa. The nymphs feed extensively on the buds, sometimes even preventing the flowering of the plants. When they work on the seed pods the results are similar to those produced by the stink bugs.

These two bugs are quite similar in their life cycles. They winter as adults, lay their eggs in the spring in the stems of the plants upon which they feed. The eggs hatch into wingless nymphs that mature in three to five weeks and lay more eggs

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so that there are several generations each year.

The first step in control is the elimination of their weed hosts near crops. DDT, methoxychlor and toxaphene are very effective chemical controls. Recommendations for their use vary with locality.

Clover Seed Chalcid

Differing greatly in habits and appearance from the bugs just mentioned but just as damaging to forage seed crops is the small, black, wasplike clover seed chalcid. Hay crops are never harmed by this pest. The seed crop, though, may be infested as much as 85 per cent, with losses running 50 pounds or more to the acre.

The female deposits a single egg in the newly forming clover or alfalfa seed. The larva hatches from the egg, devours the inside of the seed and pupates, emerging from the seed in a few days as an adult chalcid, which mates and begins to infest more seed. Half a dozen generations will appear during the course of a summer. The larva that hatches in the fall remains in the seed pod over the winter until the following spring.

There are still no really effective controls against this chalcid, though there are indications that toxaphene may be of help. Natural enemies, using the first crop for seed instead of the second and removing the hay crop from the field before the seed has had time to mature, help to reduce the damage inflicted by the pest.

Cutworms and Armyworms

The larva of one of the night-flying moths is the little villain that goes around in spring and summer cutting off young plants near or just below the ground. This is the cutworm that works away at night reducing corn, beans, cabbage, cotton, tomatoes, tobacco, and legumes to withered heaps.

The moth lays its eggs, 200 to 1500 at a time, either on plants or directly on the ground. After the worms hatch out they spend several weeks satisfying their ravenous appetites, then pupate in the ground, eventually emerging as adult moths. Some species winter in the egg state, others in the larval stage, all ready to go to work again at the first rustle of spring.

Armyworms are a species of cutworms, so-called because of the manner in which they mass together and "march" from field to field in search of food. They seem to undergo cycles and vary greatly in abundance from year to year, their worst invasions following cold, wet springs that destroy many of their insect enemies but provide luxuriant plant growth. While they are most commonly associated with corn damage, they attack all grasses, and grain crops.

In case of a serious invasion of the armyworms, the hordes may be stopped with poison baits made of a mixture of

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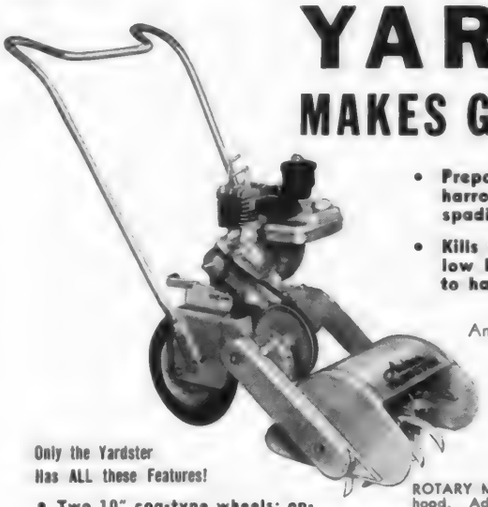

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one pound of paris green or sodium fluosilicate to 25 pounds of wheat bran moistened with water and deposited in infested fields early in the evening just before they begin to feed. These baits are effective against both the cutworm and the armyworm.

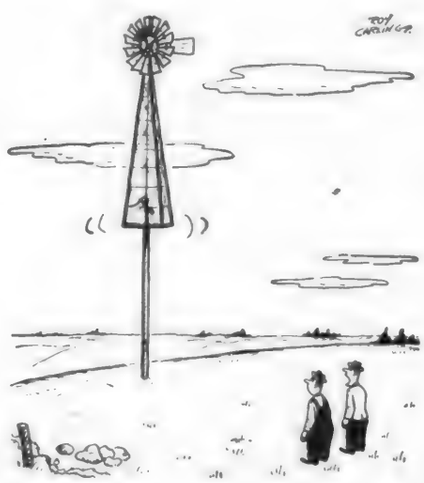
Dusting with 5 per cent DDT does a good job of stopping the worms when applied at the rate of 40 pounds to the acre and worked lightly into the soil. A 20 per cent toxaphene dust applied at 10 to 15 pounds to the acre is even better. Those who prefer sprays to dusts should use two pounds per acre of a wettable powder containing 50 per cent DDT mixed with 40 gallons of water. The toxaphene may be applied by airplane at the rate of 1½ to two pounds of actual toxaphene in 2 gallons of spray per acre.

And again, a word of caution against feeding DDT or toxaphene treated forages to dairy stock or stock being finished for slaughter. Don't use them.

Alfalfa Webworms

Like the cutworms and armyworms the webworms are the larvae of a moth that lays its eggs on the underside of the alfalfa leaves. After four or five days the eggs hatch and the small greenish worm encloses itself within its webbing to feed for about 20 days. Then it drops to the ground and spins a cocoon in which it pupates, the adult moth emerging in about ten days. There are several generations during the course of the summer and the insects overwinter either as caterpillars or in the pupal stage.

Early cutting of hay combined with clean fields and clean fence rows helps to control this pest, but if alfalfa is being grown for seed an insecticide will have to be used. Toxaphene does a good job when sprayed at the rate of two pounds per acre or used as a dust at three pounds per acre. The application should be made before seven in the morning or after seven in the evening if the plants are in bloom in order to give additional protection to the bees.



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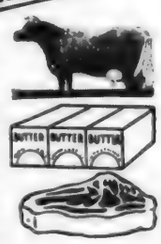

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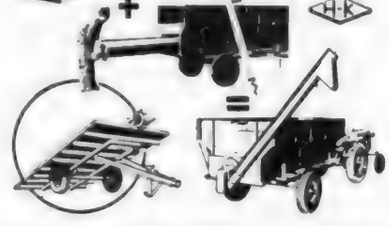

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HAY CRUSHERS

(*Continued from page* 63)

than the slightly bleached second cutting hay. A hank of the uncrushed hay was brittle and crackly while the crushed hay was still pliable and soft. "Our cows seem to like this crushed hay better," Woodard said, "and we aim to give them what they want."

Where dairymen, like Laybourne and Woodard, are highly critical of the hay they feed their animals, men who raise race horses are downright fanatical. At Two Gaits Farm in central Indiana, where Leo C. McNamara and his eleven sons have raised some of the fastest harness horses on the tracks today, they insist that only the best hay be fed to such animals as Hal Dale, sire of Good Time, the all-time money winning pacer, or to Sky Raider, a full brother to the immortal Greyhound.

Young Tom McNamara saw some of the baled hay made with a crusher at the C. V. Whitney farm near Lexington, Ky., when he was visiting and was so impressed with the green color and the leafiness of it that he convinced his father and his older brother, Ed, who manages the farm, that a crusher with mower attached was needed at Two Gaits. Now they all believe that the crusher will save them hay and give them better hay. To anyone who isn't color-blind, the difference between the crushed hay and the uncrushed hay is startling. You can pick out every bale of boughten hay in their barns by its pale color as compared to their home grown green bales.

The machine they use is a John Bean side drawn model with the mower mounted directly in front of the crusher. This model has now been discontinued in favor of the trailer type. It is pulled with power to spare by a three-plow tractor which also provides the power for mower and rollers. The machine is put on the field early in the morning and, in good haying weather, the hay can be raked in the afternoon and baled that evening before dew-fall. More often it must dry until the next day, but neither they nor the Laybournes have had crushed hay in the fields longer than two days.

This curing time is in line with the experience of the University of Illinois where they found that first cutting alfalfa averaged 25 hours drying to 20 per cent moisture for crushed hay as compared to 52 hours for uncrushed; the second cutting ran 23 hours for crushed and 45 for uncrushed. Red clover ran pretty much the same as second cutting alfalfa while soybean hay was found to take 49 hours for the crushed hay as compared to 127 hours for the uncrushed. In field tests in New York and other parts of the country it has been found that while crushed hay will give up its moisture faster than regular hay it will also absorb more moisture such as dew and rain. In most trials it was found that overnight

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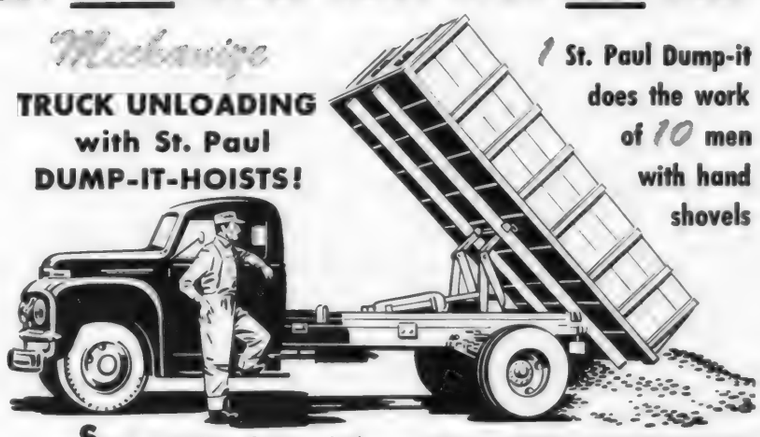

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	60"	30"	10'	7½
HA 16 F	72"	30"	11'	7
	84"	54"	14'	7
H 16 F & H 16 FW	84"	30"	12'	8
	84"	42"	13'	9
	84"	54"	14'	10
H 18 F	84"	54"	14'	12
	102"	48"	15'	9
H 20 F	102"	36"	14'	9
	102"	48"	15'	10
	120"	54"	17'	9
L 20 F	120"	42"	16'	11
	84"C/T	36"	13'	14
	96"C/T	48"	15'	14
	102"C/T	54"	16'	14
	120"C/T	60"	18'	12

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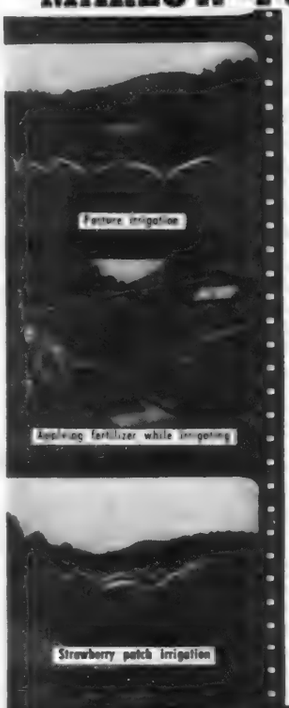

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the crushed hay would pick up one or two percentage moisture while the uncrushed hay kept the same moisture content it had the evening before.

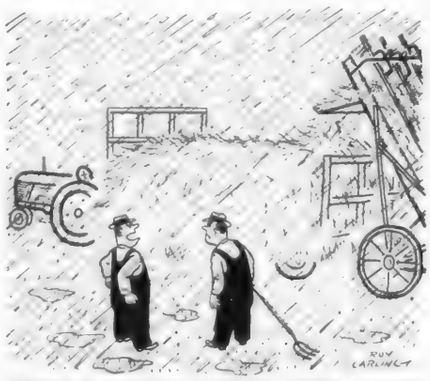
In the field, the McNamaras have found that they can cut and crush between twenty and thirty acres of hay a day. To do this they have to get the machine out early and keep it moving. In two years of use they have had no trouble with the machine other than breaking two or three pitman bars on the mower. They have had very little trouble with clogging the rollers with hay though once one of the men had a cat jump out of the tall hay and get pitched between the rollers. "That was a mess I won't forget."

At Laybourne's where the mower and the crusher are separate units they have occasional trouble with clogging. "I usually run the crusher," Gene Woodard says, "and I have found that when turning a corner or going over an uneven place I sometimes swing the crusher so that it picks up two swaths of hay. When you double the load that way it's bound to clog. But it isn't hard to clear the machine, you simply pull a release rope which takes off the tension and hold it until the rolls are cleared. When you release the rope the tension goes back automatically.

"One trick I've found that helps with the crusher," he continued, "is to run the tractor in second gear so that the power take-off is running the crusher rather fast in comparison with the forward speed of the tractor. On corners I can avoid getting clogged up if I put it in low and ease the machine around. Another little trick I learned was to remove the last two teeth on the right end of the pick-up so that I don't get into the next swath so often."

A variation on the smooth rollers of the crusher has been worked out by the University of Wisconsin in an effort to beat the clogging problem. They have developed corrugated rolls which fit together like cogs and crimp as well as crush the hay. Though this experiment is very promising, they haven't been able to bring the price of the rollers down to where they would be practical on the farm.

The most common complaint about the crushers is not mechanical but financial. The machines run from just under $1800



"And we pay taxes for that XXX weather bureau!"

CRUSHED HAY, whether baled in round bales or conventional cubes, retains more leaves and is softer and more pliable.

for the most expensive model to around $1300 for the least expensive. At this price, the machine is not something you buy for a whim. Most people who have studied the financial aspects of the crusher claim that it will pay its way if used on at least 100 acres of hay during the season—over 33 acres of three cutting hay or 25 acres where you can get four cuttings. For the farmer with a smaller acreage and for those who want to see the machine in action before buying, there are a few custom operators who are cutting and crushing hay for $3.00 an acre.

TURKEYS

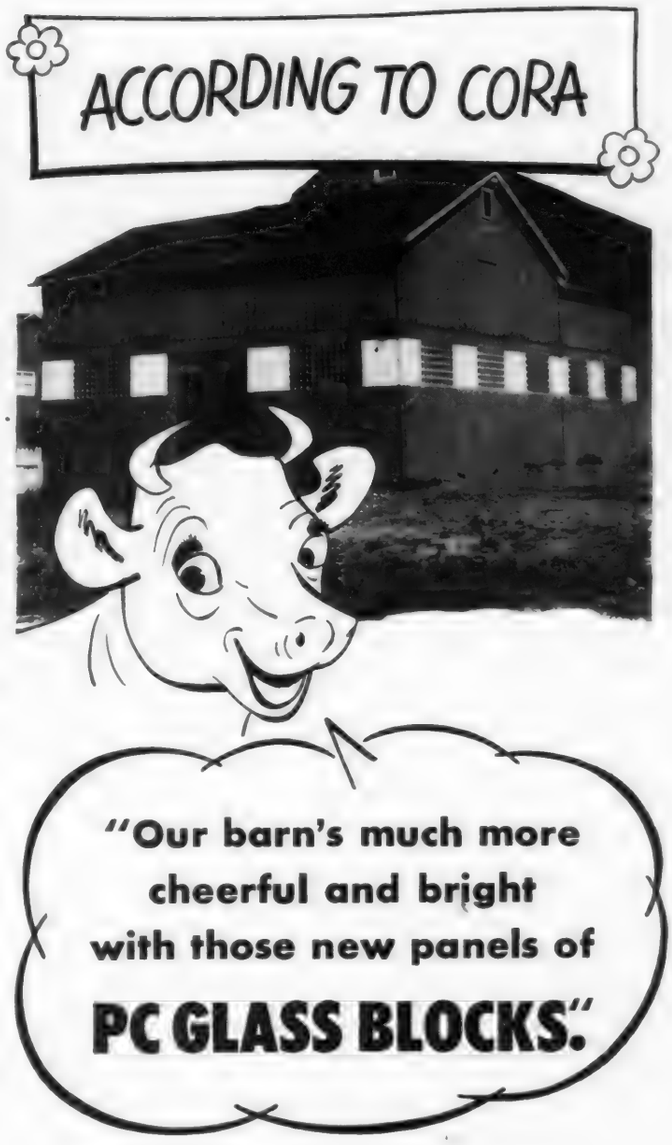
(*Continued from page* 51)

shed roosts for each range, which get three batches of about 2,000 birds or a few more per year. The range is used but one year. The first batch of turkeys on it makes short work of the grass and those following find nothing but pale green ground cover to peck on. Then he plants it in oats with a grass mixture and plans to take off a grass crop for two years before going back to range again. His 1952 oats, planted on the 1951 range, stood well over a man's head and made one and a half tons of grain to the acre.

"Turkey growers in the Midwest and New England would probably run into trouble if they tried the same kind of management I use here in Washington," Herman says. "I can crowd them here and am not bothered by disease. It may be the Washington climate. I had more than my share of luck, too."

In the early spring Herman brings the day-old poults from the hatchery to the farm and pops them under the brooders, which are heated by propane gas. "I start them at 105°, which is a little warmer than customary, but it keeps them from piling up under the brooders. After a week I drop the temperature to 95° and gradually lower it, depending on the outside weather, for five or six weeks. The last couple of weeks the poults spend in the brooder the temperature is normal."

He uses either chopped straw or shavings for litter, which he likes to change at least once a year. Between batches in a



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brooder he stirs up the old litter with a small rotary tiller and puts down a few new shavings. When the poults are 8 weeks old they are taken out of the brooder houses. After 8 more weeks on range they are ready to market.

From mid-March, when the first batch of poults goes into the brooders, until mid-July, when they begin to go to market, is a rather easy time for Herman. The turkeys require little attention, although he says he was doing everything the hard way in the beginning and working 15 hours a day to boot. Now he has a full-time worker and on weekends during the school year he hires an extra or two. His 12-year-old daughter helps out in the pinches as a brooder watchman. It's when the marketing gets under way that his double shifts start. From then on there is a batch of poults either going into the brooders or being shifted onto the range. In between times there is feed to buy, the automatic feeders and waterers to be filled, books to be kept up to date, and a watchful eye kept on the brooders to see that the poults aren't piling up. The bins on the ranges are filled every 5 or 6 days and refills in the brooder feeders are made every day. It takes the better part of a day to corral, load, and deliver a truckload of 800 birds to market.

Financial Statement

In 1951 Herman sold his tom turkeys, or about one half of the 33,000 turkeys grown, for cut-up fryers at 10 to 12 weeks of age when they averaged 5½ pounds each. He received 39 cents per pound on a live-weight basis. The hen turkeys were sold at 20 to 22 weeks of age as mature turkeys with an average New York Dressed weight of 7 pounds each and he received an average price of 45 cents per pound. At these prices he made 3 to 4 cents per pound profit, or about 20 to 25 cents per bird.

His gross in 1951 on 33,000 turkeys was $81,000. During 1952, with 57,000 birds, his gross was correspondingly higher, but profits were lower.

"Prices sagged in the spring, but recovered somewhat in the late fall. I was lucky to break even on part of my crop," he says.

The day-old poult itself, pullorum tested, cost him 43 cents in total lots of 20,000 or more the first year he was in business, and he figures that to bring it to 7.5 pounds takes 24 pounds of feed costing about $1.44. During the first eight weeks, they are given all they will eat of a mash in crumble form of 28% protein. This currently costs $6.35 per 100 pounds in 10-ton lots. The next eight weeks turkeys on range get a pelleted feed of similar analysis now being fed to fryers in Washington. This costs about $5.65 per 100 pounds. Both the poult and adult turkey feeds are heavily loaded with antibiotics.

They also get, free choice, a grain feed which they eat sparingly. This is usually

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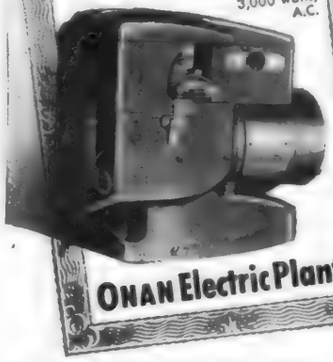

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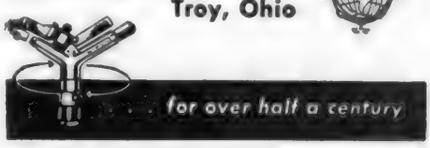

milo when the price is right, because ordinarily it costs a lot less than corn and is only a point or two less than corn in feed value. In 1952, however, there was a poor milo crop and the price went up to corn level. Then Herman paid $4.35 per 100 pounds for both grains. In all, he averages about 15 tons of feed per week.

Also figured in his costs is the one cent per poult which he contributes to the "Eat More Turkey" fund, a national fund which goes to promoting turkey as a year-round meat. Then he must also figure on a 3-cent-per-pound shipping charge on turkeys that go as far as Chicago, and about half of his 57,000 turkeys in 1952 went to these markets. Frozen birds go mostly to eastern markets, although the big population centers around Seattle and Vancouver are buying an increasing number. One of the big customers of the Washington Cooperative Farmers Association, which does the marketing for Herman, is the Safeway chain of grocery stores, which packages the turkeys in cellophane and sells them as broilers and fryers. Broiled or fried turkey is a novelty anywhere—in the Northwest it is revolutionary.

"A profit of 20 to 25 cents a bird is a pretty narrow margin," Herman says. "A drop in the market or a disease epidemic could wipe a man out overnight. But that's the gamble a poultryman must take. I figure as I learn more about the business I can shave a cent or two off the cost per pound of raising them. That will be all velvet."

Feed Costs

Herman already has cut his feed cost by buying in bulk instead of by the sack. During the first year he bought sacked feed, but last year during the slack season he built feed storage bins over the driveway into his barn and now buys in bulk by the truck load, 10 tons at a time. He fills his automatic feeder direct by gravity from the bins. This takes him 5 minutes to fill his two-ton feed wagon, which unloads itself by a worm-type elevator and empties into the feeders on the ranges.

To shave costs even more, he held out 600 of his best hens and 60 gobblers in 1951 and this year he produced his own eggs, which are hatched for him on a custom basis at the Co-op hatchery. His hens will start laying at 8 months, doing their best in production for the 4 or 5 months following, then falling off. Each averages about 100 eggs during the year he keeps them.

Herman thought we might like to see him put up a load for the killing station. "Come back early tomorrow morning—about seven. We've got a system to this job," he added with a slight note of pride.

Next morning when we drove into Herman's barnyard there was a terrific clatter out on the range across his oat field. A column of dust and feathers spiraled up where about 800 complaining birds had been driven into a small wire corral connected with the loading

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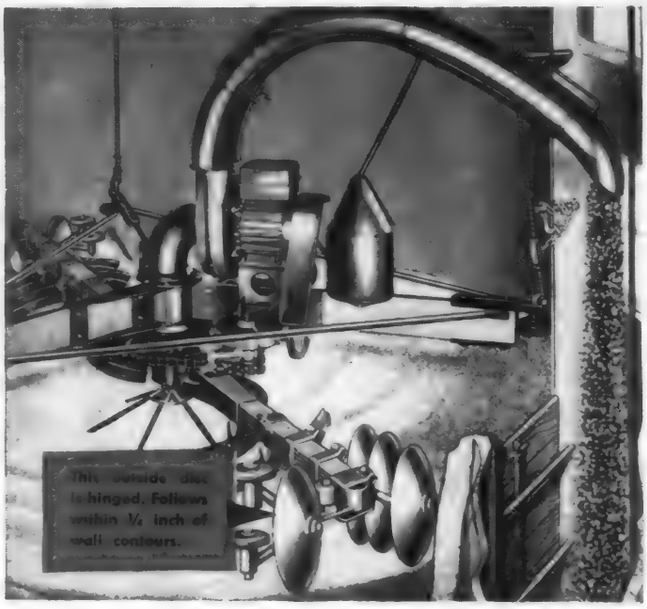

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The Jamesway-Leach works while the help does other chores — shuts itself off automatically at any pre-set time selected. Why not install this profit-making machine on your farm now? It's also ideal for summer dairy or range feeding — keeps hired help happy the whole year 'round.

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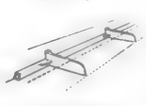
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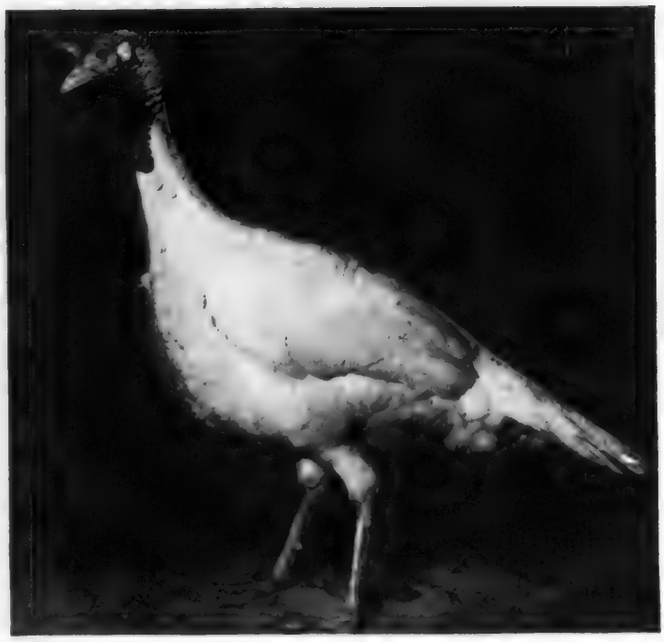

THE BELTSVILLE WHITE is a small, fast growing bird with a good proportion of white meat. Young toms make excellent fryers.

chute. Herman's nephew, who comes down from Seattle for work, was shooing turkeys into the chute with an old broom. As soon as 20 or 30 turkeys filled the chute he closed the gate behind them. Ed Erickson, Herman's hired man, then began grabbing legs and pulling turkeys out a small door in the chute. He handed them to Herman, who was standing on the truck, stuffing the birds into crates.

As he loaded, Herman explained the process in snatches of information. "We put 8 or 10 toms in each side of a two-compartment crate, or 10 or 12 hens—keeping 'em separate for the killers." He said it didn't take long to distinguish a tom from a hen. "Ed grabs the big knees when he wants a tom, little knees when I call for hens."

There was a dead turkey hanging from the fence. "Got smothered in the chute," Herman explained, "but I bled him and we'll have him for Sunday dinner.

"A few birds got away this morning—got up spunk enough to try it. These Beltsvilles can fly almost as well as pheasants. We don't dare load in a high wind. Tried it once and a hen took off over the corral fence; three or four hundred followed her. Took us all day to round them up."

Herman's nephew is adept at grabbing them on the wing, though, and had retrieved most of the more adventurous ones by the time we got there that morning.

When they finished loading there were 40 crates on the truck, piled one on the other. Herman borrowed my pencil and made a quick calculation on the side of the crate. "I've got 864 here," he said. "That's a pretty good sized load. Ed will have them in Mt. Vernon in a little more than an hour and they'll start killing right away."

A Dunce Cap for Turkeys

After two years of close association with the birds, Herman has very little respect for a turkey's IQ. "For sheer, inborn stupidity the turkey takes the cake," he says. "I don't know of any other living thing that doesn't know how to eat when it's born. Some turkey raisers spend a lot of time teaching poults to eat. What a swell job I would have dunking 57,000 beaks in the feed! I cover the litter with cardboard, sprinkle mash all over this and forget about them. Wherever they peck there's feed and most of them find out for themselves how to eat." In spite of this trick he loses about 2 per cent in "starveouts," the industry's name for the poults which never learn to eat.

"Here's another example of just how dumb a turkey can get," Herman says. "Last spring when we changed our water system, we took out gallon jugs we had been using and put in a Jamesway automatic system. Some of the poults couldn't find the water and we lost a few from dehydration before they could be taught to drink from the new fountains.

"Even with these losses through starveouts and dehydration," Herman says, "I marketed 93 per cent of the poults I bought last year. That's a good percentage with turkeys, but I think I can do better than that, because we have had only slight losses from coccidiosis, which is kept under control by a sulpha preparation given in the water, and no losses that I know of from disease in adult turkeys. Five per cent of all our losses were caused by smothering, trampling, and injuries in transporting them to the ranges because these Beltsville Whites are flighty and they are likely to injure themselves when they get excited. We have to be careful not to put the older birds in that range along the road—people stop and walk up to the fence and that starts a stampede. A low-flying airplane is another nuisance—the turkeys all bunch up when they hear one and there's danger of them smothering."

As soon as his last load of turkeys was shipped in the winter of 1951-52, Herman decided he might as well improve the shining months of January and February by raising a crop of broilers. He brooded 12,500 chicks and sold them 10 weeks later at 3 pounds each.

"I made money on chickens as an in-between crop, but I was tired of looking at feathers when the turkeys came. I think a rest from feathers would be good for me and I don't think I'll do it again," he says. "Besides, I want to make the fields that I don't have in range pay their way and I can't do that and raise chickens on the side."

Herman admits that he has had considerable luck in becoming, in his second year, the king of Washington turkey growers. "For example, I've lost only 4 turkeys in loading more than 90,000, which is almost a miracle," he says. "Then last summer a bunch of dogs got under the fence and scared the daylights out of my flock, but I lost only 29 out of the 6,000 that were on the ranges during that raid.

"In December of my first year I got my last load to Mt. Vernon on the evening of the 16th. The next morning the temperature had dropped to 15° and a 60-miles-an-hour wind was blowing. If I had tried to load those Whites in that gale they'd have sailed clear to Mt. Baker.

"Turkeys are a great crop," says Herman, "but you've got to go in them in a big way, to keep your costs down. Otherwise you'd be keeping turkeys without much chance of their keeping you."

20 Million TREES a year!

Fred Musser compares an ordinary seedling with a Musser-grown seedling of same age (at right)

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Special Norway Spruce, 2 yr. sdlgs., 5"-10"	35 per 1000
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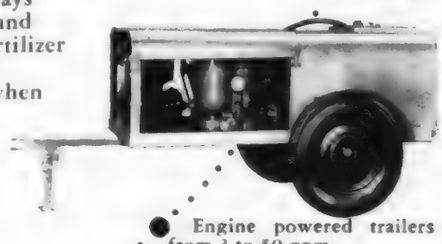

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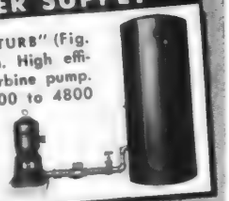

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MILK THROUGH A HOSE

(*Continued from page* 39)

cidental spillages between farm and dairy as well as can runover at the milking time.

3. Elimination of much of the hard work at milking time. The bulk system saves labor by eliminating the job of moving and washing milk cans.

4. Elimination of replacement costs of milk cans.

5. The bulk handling method frequently results in a reduction of the hauling rate. In the Maryland and Virginia area, in some instances, rates have been reduced 4 to 10 cents per hundredweight. At Columbia, S.C., the rate was reduced from 35c to 20c per hundredweight. At Dayton the rate was reduced from 40c to 30c.

6. There is usually a saving in the electric bill with the cold wall tank system of cooling milk. Users report savings from $1.00 up to $8.00 per month, depending upon the amount of milk shipped.

7. The producer sells his milk in his own milkhouse, thus eliminating any controversy over milk weights.

8. Butterfat sampling is made under ideal conditions. The present method of sampling from cans is not accurate. Some days the sample may favor the producer and other days the plant.

9. Better quality milk is produced as a result of the faster cooling and colder storage on the farm. Producers report aeration during cooling helps remove odors.

10. A smaller milkhouse is required. It is possible to increase production using the present dairy house as the producer's tank takes up much less room and there is no need for added can rack space.

One Maryland dairyman summed the advantages up in a few words, "All we have to do now is look after our cows and see that they are milked right—and that's how we make our money."

The advantages to the hauler are:

1. Does away with all of the hard work of handling milk cans. As one milk tank driver says, "The hardest job now is driving the truck—I don't miss those cans at all."

2. By doing the work with pumps and eliminating heavy can lifting it is possible to use older men on the routes and men with less rugged physical qualifications than required for can truck operation. It is easier to keep personnel on the tank routes than on the can routes.

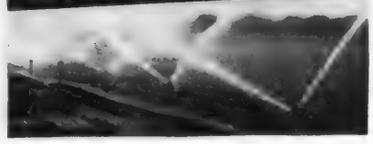
3. Bigger pay loads are possible with the tank trucks.

The advantages to the dairy are:

1. Better quality milk will be received due to the faster cooling and storage in the producer's cold wall tank.

2. Colder milk will be received at the dairy. thus making a saving on refrigeration.

WATER any field



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3. The bulk system eliminates can washing, receiving and sampling operations.

4. In some dairies it is possible to eliminate all receiving room equipment, for the milk is pumped directly from the tank truck into the pasteurizing vat.

5. Elimination of the can washer helps solve the problem of sewers becoming stopped up by fats from the can rinsings. This is becoming increasingly a big problem in some cities.

6. It would be entirely possible with the bulk system to eliminate receiving plants in the country. Milk could be picked up on the farms and brought directly to the dairy, thus eliminating the investment in equipment and the expense of operating receiving stations. The quality of the milk is improved *at the farm;* this is the place at which good flavor and low bacteria counts should be made.

The people who drink the milk get cleaner, better tasting milk. And it has been high quality milk that has made this country the greatest milk market in the world. Americans consume 9.7 pounds of butter, 7.2 pounds of cheese, 14 pounds of ice cream and 180 quarts of milk and cream per person per year.

SHIVAREE

(*Continued from page* 77)

the kerosene lamps and the new pots and pans rattled on the shelves.

Finally Jake Hermann, an old hand at bellings, mounted a chair and shouted for quiet. "Dan and Alice ought to be in the featherbed by the time we get there," he said. He elaborated on the plan of attack and warned that the least noise would be punished by a bust on the nose. "You kids had better be quiet or we'll send you all home," he added. "Now let's go.

By the light of a full moon they started on the two-mile walk to the Featheroff farm, the crowd of fifty or more stringing out along the country road. Jake, with one or two older men, was in the lead, the better to restrain the small fry. Then came a tight knot of girls making a giggling pretense of ignoring the heckling troop of young men, and bringing up the rear, the bolder youth, each with his girl.

There was a crunch of feet on the gravel road, the half repressed shouts of the small boys, and once a metalic thump as someone dropped his cowbell. There was speculation on what was going on now in Alice Featheroff's upstairs bedroom. Far in the rear someone shouted, "Hey Mary, how would you like to be where Alice is!"

"Shut your big mouth," ordered Jake. "We're gettin' there."

When the bellers came within sight of the Featheroff home they saw the light of a kerosene lamp reflected against the shade of an upstairs window. A wisp of smoke from the kitchen chimney curled lazily across the face of the moon. The light was in Alice's room, an informed source announced, and it was assumed that the happy couple were preparing to retire.

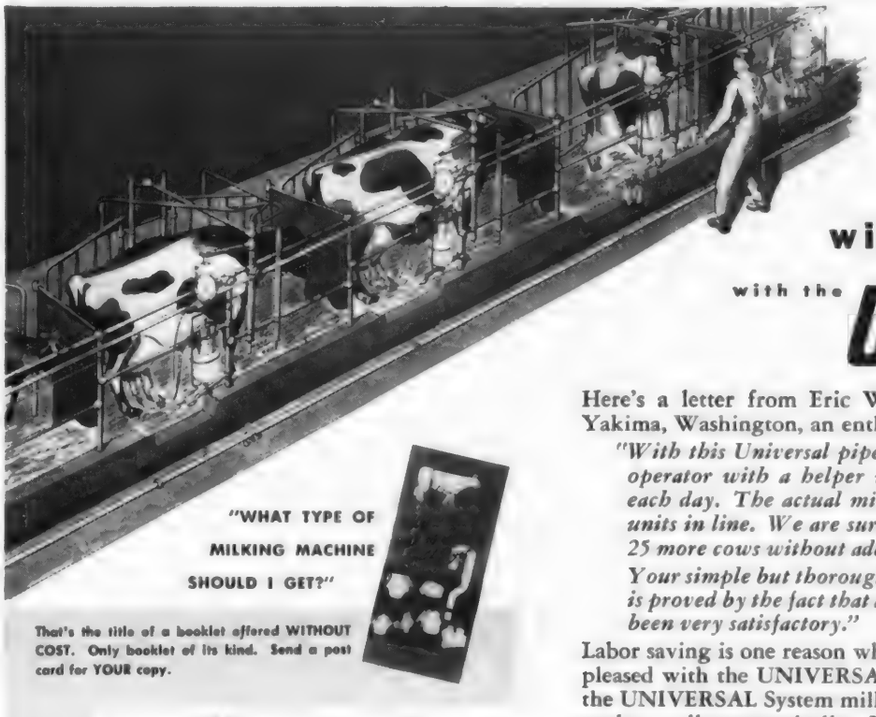
Alice had persuaded Dan to wait up for the bellers, hiding that fearful expectancy with which she looked forward to her wedding night. But Dan had no such delicate qualms. "I'm sleepy," he said. "Come, we'll go to bed."

At that moment the bellers were surrounding the house. Gus Featheroff's old bitch, who slept back of the kitchen stove, was deaf as a stone—there would be no trouble from her; this would be a complete surprise.

"We'll wait until they get good and settled in bed," Jake Hermann ordered. "When I shoot off my shotgun, let 'er go."

Shadows moved back and forth across the window shade within the lighted room. Because he understood that to small boys a belling is the most fun of anything, Jake stationed himself among them. The noise hadn't started yet and the boys at the Featheroff belling did not like to wait. It was a brisk night and the cold began to nip the feet and hands. Jake was prepared to squelch any signs of a premature attack.

Finally Dan Hoffman's figure converged on the lamp and the light blinked out.



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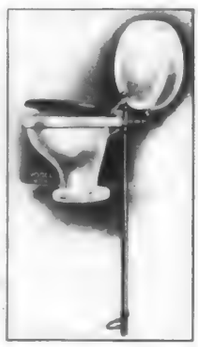

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"Wait 'til they get snug and warm," warned Jake.

A few minutes later a double shotgun charge split the darkness. There was a sudden blast of noise from horns, bells and kitchenware, accompanied by howls and catcalls. The terrific clatter penetrated the deaf ears of Gus's bitch, who set up a frenzied barking. A tree full of guineas on the far side of the barn woke up and gave the alarm in their rusty-gate cackle. The echoes bounced off the far hills of the valley.

The noise swelled up and died down and then rose again, but all was darkness and silence within the house. For a half hour the clatter continued; then the bellers began to lose patience. There was a shower of gravel against the window; someone shouted, "Let's smoke 'em out!"

Jake boosted one of the Hinkle boys to the roof of the lean-to kitchen and Felix Groot brought an armful of grain sacks from the barn. These were stuffed into the kitchen chimney and the crowd retired to await developments. These were not long in coming.

The glow of a lamp appeared in the bridal suite, the shade went up, and both Dan and Alice thrust their heads and shoulders out the window. Smoke curled around them.

They were gasping and coughing, and Dan was mad. "Go 'way!" he shouted. But the bells and horns broke out anew and a handful of corn rattled off the house. Dan revealed his horse sense by not flying in the face of fate. He called out, "All right, all right, we'll be down."

Soon he and Alice appeared at the front door, Dan's hairy legs silhouetted inside his nightshirt. Alice's plump figure was wrapped in a voluminous robe.

"Kiss your bride," someone shouted. Dan dutifully leaned down and pecked Alice on the top of the head. From beyond the circle of light round the doorway, Dan's friends shouted their lusty comments. "Got a family started yet, Dan!" "I forgot to kiss the bride; how's about another chance!" "Has she chased you with the rolling pin yet, Dan?"

A small boy whispered plaintively to another, "I wish he'd give us our candy pretty soon. My mom said I had to be home by eleven o'clock."

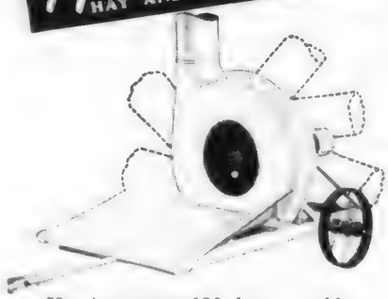
Alice buried her face in Dan's shoulder. Recalling how long it took for him to calm Mrs. Hermann after their own belling, Jake stepped up on the porch, reached for Dan's hand, and recited.

"Your friends congratulate you both, and wish you much happiness."

"Thanks," said Dan. "Here's something for a treat. Don't forget the kids." He handed Jake $5.00.

Back at the grocery store Jake bought a box of good five-cent cigars for the men and ten pounds of hard candy for the women and kids. It was late; they were happy and sleepy, but Dan and Alice were now members of the community, in good

TRIUMPH Hayclone
HAY AND FORAGE BLOWER



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standing, as a married couple.

It was among the Pennsylvania Dutch that the shivaree, or belling as it was called in those parts, achieved its full flower. Around Emaus, in the Lehigh Valley, the belling of Dan Hoffman and Alice Featheroff was an event of the spring social season of 1901.

The Shivaree According to Webster

Webster prosaically defines shivaree as a serenade of a newly married couple. But it was usually more than a serenade; it was an initiation, a ceremony which introduced a new family to a community. As a social affair it was subject to local embellishments and variations limited only by the imagination of its self-appointed leaders. It could be, and often was, a dreaded event for the young couple, an ordeal which clouded their wedding day. In spite of Webster, there was often more horseplay than harmony at a shivaree.

The lustiness with which a shivaree was carried forward was a good barometer of the popularity and social standing of the new couple. A well-liked young man could expect all his friends to be present to express their affection in cruel and unusual ways. On the other hand, if he had enemies in the community, or was not generally well liked, the shivaree offered an excellent opportunity to settle old grudges under cover of darkness and numbers. Whether given in fun or spite, the shivaree was no trivial matter for the bride and groom.

But not to be shivareed at all was a fate even worse. To be ignored marked a couple as so utterly unimportant that never could they expect to attain any sort of social standing. People would always say of them, "They weren't belled, you know."

Other Times, Other Places

Not all shivarees came off as smoothly as Dan Hoffman's and Alice Featheroff's. A gentle, kindly man often deteriorated during the ordeal of his wedding. He might carry nerves into the wedding night and become extremely stubborn when the shivaree showed up. A Greensburg, Indiana, bridegroom refused to present himself and was taken, kicking and shouting, from his bridal bed. A sack was tied over his shoulders and he was stuffed, willy-nilly, into the turtle back of a Ford roadster. One of the abductors had just captured a skunk and the varmint was tossed in with the reluctant bridegroom. After a wild ride over back country roads he was returned to the arms of his bride. The skunk was exhausted; and the bridegroom's contribution to the scented bower of love did not please the bride.

Ingenious ways to render the groom *persona non grata* to the bride have gotten many a marriage off to a slow start. In the West the groom was plied with hard liquor by his well-wishing friends until he was highly unacceptable in the marriage bed. Among the rugged folk of

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the mountain country of Kentucky and Tennessee it was customary to abduct the bride or groom or both, on the night of nights, and to keep them apart and awake until both became thoroughly disgusted with the whole institution of marriage. This often led to violence. Near Hazard, Kentucky, a shivaree crowd was peppered with birdshot when an irate groom discovered a party of his friends making off with his bride.

The common denominator of shivarees everywhere was a ransom given either in the form of money, food or wine to buy peace and privacy. This was an attractive feature for small boys, who often outnumbered grownups at shivarees, more concerned about the treat of candy than about wishing the new couple Godspeed on the journey of life. Knowing a good thing when they found it, the younger set in a community might shivaree a couple night after night until patience and pocketbook were exhausted. In New England in the old days the serenaders were invited into the house for doughnuts and pie, preparations being made in anticipation of their visit.

It was customary in some parts to grant immunity in case the belling could not be held on the night of the wedding. Elaborate strategy was planned to evade the bellers who set up a system of spies, counterspies, and stool pigeons to track down the fleeing couple.

A Dash of History

The shivaree dates from the Middle Ages and probably originated in France. There it was known as the *charivari*, from which our English word shivaree, has been corrupted. It is probably a survival of primitive ceremony to exorcise the evil spirits which sought to plague newlyweds. The spirits were allergic to noise.

By modern times the custom had lost its superstitious implication and had degenerated into coarse horseplay. In some countries the shivaree is an expression of disapproval of a person married the second time. In others it is community punishment for having neglected certain conventions.

The institution was brought to North America by the French by way of Louisiana and Canada. It soon spread all over the country under various names—horning, rouser, wake-up, belling, jamboree, tin pan shower, skimmelton, callithumpian serenade, and others. In Germany the serenaders wear masks; and they call the ceremony Katzemusic—cat's concert.

The shivaree is a rare event today. Country newspapers in the Ozark and hill country of Kentucky and Tennessee report an occassional revival, but in most places, like those fine old rural institutions, the husking bee and the quilting frolic, it is rapidly becoming only a memory of youth. This is indeed unfortunate. There is nothing like a shivaree to get a new couple off to a good start.

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FEED FACTS

(*Continued from page* 61)

After 60 days, the 100% straight cob was made into ⅓ corn and cob meal and ⅔ cobs; after 90 days, the corn and cob meal was pushed up to 40%. The cattle doubled their rate of gain on this last feed over the first one. After 120 days, the cattle went on heavy feed.

Urea, molasses and cob gave Garst the formula he wanted to "carry" the cattle and admit a small gain each day, until he decided when to add grain in order to make the cattle fat for the market. (See the Spring 1952 issue of *Farm Quarterly* for Garst's feeding with urea, molasses, corn and cobs and bean meal.)

The Roughages

The roughages include the old favorites, hay and corn stover, and all the straws, cottonseed hulls, citrus pulp, sweet corn wastes at canneries, grain chaff and screenings, bagasse, peanut skins and hulls popcorn and field corncobs, pea vines, kelp, and some others in limited quantities. Each of the roughages has its good and bad points. Peanut hulls, sugar cane stalks, and poor, stemmy hay, like ripe sweet clover, are so high in lignin the animal cannot consume enough to flourish. Lignin is indigestible and passes through the animal without making a contribution, merely going along for the ride. When lignin content is high, it insulates the cellulose so that the bugs cannot get to it.

High lignin roughages can be fed in limited small amounts, 6 to 8 pounds of old, stemmy hay being as much as he can handle well.

There are two ways to feed profitable cellulose roughages: (1) with small amounts of concentrate, as a maintenance ration for wintering over. This is the well used old-fashioned method; (2) with ample protein, sugar and starch added to develop a low-cost feed which will still put a profitable gain on the animal.

Ordinary roughages will keep the body and soul of the animal together,and little more. The good legume hays will do that and add some growth, but gains will not be fast and there will be little fat go on, Hay alone is not a good growing or fattening feed.

If balanced with grain and molasses, the roughages become valuable low-cost feeds.

All the roughages must be fed with a quickly digestible feed in order that the bugs in the rumen will have a source of food on which to grow and multiply. This can be supplied from grain, molasses or protein.

The silages, corn, grass and peas, are usually classed with the roughages. However, in reality they are half-breed feeds: they have some of the high energy values of grains, because corn silage is part grain, and grass silage with legumes has a high protein content. The silages are good cattle feeds and cattle fatten well on them

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Mr. Mommsen, an eleven year Moulton user who has over three miles of irrigation pipe on his 600 acre farm, says: "Even though we had sufficient rainfall this past season for my potato and rutabaga crops, my investment in Moulton Irrigation equipment proved very profitable. Without the insurance of my Moulton system, I would not have fertilized or seeded as heavily last Spring and as a consequence, my yields would have been considerably less. I have been doubling and tripling average yields made without irrigation."

Other Moulton users report similar, profitable results. All praise the patented Moulton Quick Coupler that can be easily, speedily coupled and uncoupled by one man from carrying position, and the ease of moving the lightweight aluminum pipe from one setting to another.

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Science in the Barnyard

By DR. HESS

Wintertime can be doubly tough for dairy cows. They lose out on Old Sol's tonic benefits through long and dreary months. And each day on coarse, dry feed short-changes them on minerals. Many times, cows on our Research Farm have been fed the same winter ration, with and without our Stock Tonic added. Those getting Stock Tonic—which supplies essential minerals and the Sunshine-Vitamin D—have averaged 25 pounds more milk per 100 pounds of grain.

To kill rats with warfarin, you've got to keep 'em coming back for more. That's why it's important to always have warfarin baits awaiting them . . . and baits more tempting than stored grain. In developing Warfarat, our ready-to-use rat killer, we tested a lot of single and combination baits to find a menu rats would like. Mice like Warfarat, too, so we recommend it for both rats and mice.

Husky litters of Spring pigs are never a matter of luck. They're the result of keeping a brood sow on the *right* ration while she's getting ready for the "blessed event." Deprived of vital minerals . . . such as iron, copper, manganese, iodine, cobalt . . . a sow is most likely to farrow weak, hairless or dead pigs. Dr. Hess Hog Special provides all those minerals plus tonics and Vitamin D. We're confident you'll find it an A-1 conditioner.

Winter calves born and kept indoors are at the mercy of germs that cause infectious scours. Any calf that survives a bout with these bugs is likely to be stunted for life. Sulfathiazole, Kaolin and Pectin from which our SKP gets its name, give you a triple-action product to stop calf scours. Many dairymen tell us this Dr. Hess formula is the best scouring treatment yet. Our informative folder on calf scours and SKP is yours for the asking.

DR. HESS & CLARK, INC.
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Scientific *Farm-aceuticals* Since 1893
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when they are balanced out. Some of the cheapest gains came from silage, properly balanced out.

The table on page 60 gives the relative values of some of the more common roughages.

Market Quality

In all the substitutions of cheap feeds for expensive feeds, the market grade of the meat is affected little or none at all, *if the ration is balanced*. When the roughages are properly balanced, the rate of gain and the market grade is about the same as when the old standbys of grain, protein supplement and hay were used. Likewise the nutritional quality of meat is about the same regardless of ration.

The red meat on all animals, whether fed on the richest protein or weeds, is about of the same nutritional value to a human being. However, on a well-finished beef animal, the lean meat is laced with fat, which is a food, and perhaps contains some carotene and the complex vitamins not found in the red meat. Meat from a prime steer tastes better but that does not mean it is more nutritious.

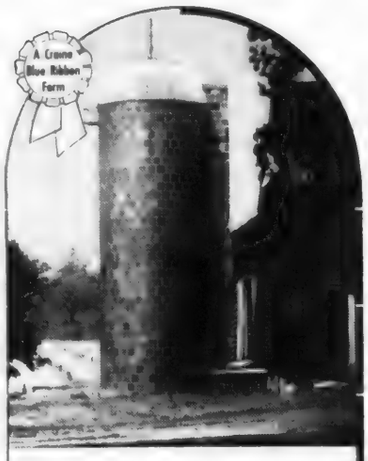
Prime finish can be turned out consistently only by feeding grains generously with the high protein meals. However, good to choice grade comes regularly from corn cobs, silage, corn stover, and other of the better roughages.

The first call on the feed which a steer eats is for body upkeep or maintenance. If he is given a bare maintenance ration, ALL will go for maintenance and he won't grow at all and, of course, there won't be any fat on him anywhere. Such a ration might be poor hay, of not more than 5% or 6% protein. He will live, and that's about all.

Now if you feed him more than he needs for maintenance, the surplus will go into new bone and muscle—he will grow. The better his ration is balanced the faster he will grow, but regardless of how much you feed him, he will not begin to put on fat until the two first needs are met—that is, until he has enough to maintain him and enough to grow on.

When you feed him more than he can use for maintenance and growth, the surplus will go into fat. How fast he fattens, provided that his feed is what he should have in quality and quantity, depends part on the steer's inheritance and part on his feed. One line of steers fattens faster than others. That is why some cattlemen bid up a bull which sires fast gaining calves.

Feeders say it is always more difficult to fatten a young animal than an older animal. While the animal is still growing, a great proportion of his feed is going into growth. Once he has reached his limit in size, all feed over and above what he needs for maintenance goes into fat. Baby beef, which is a fat young 600 to 700 pound animal, is more expensive in proportion (the fat put on) than big beef because a goodly part of every pound he eats goes into growth and what's left goes



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into fat. On older beef, the growth is over, and all the food goes into fat after the part the animal needs for body maintenance is used. Gains of young cattle are cheaper than old cattle because it takes 2¼ times as much energy feed to put on a pound of fat as a pound of growth.

The chief difference between a good cattle feeder and a poor one is more often not what they feed, but how they feed it. The poor feeder may put as little money per animal into his feed as the good one, but he doesn't balance his ration properly. In the feedlots of America, beef has been turned to market on the following formula or its equivalent:

2 lbs. grain per 100 lbs. of live weight per day;
1 lb. hay per 100 lbs. of live weight;
1 to 2 lbs. protein supplement per steer per day;
Free access to salt and minerals.

When something new like urea comes along, it is not simply added to the base formula. Compensation is made — something is taken away and something is added. If molasses is fed, some of the corn is taken away, and cellulose added. Grain can also be reduced and more cellulose fed if the protein is increased. A farmer can profitably spend many a long evening juggling prices and feeds.

To Tie It Up

Think back over the straight line on pages 58-9 of this article. That line represents what most American farmers offer their animals. Ninety per cent of the line is carbohydrates — ten per cent is proteins. There are just 3 carbohydrates — *sugar, starch* and *cellulose.* To feed *sugar,* a farmer usually pours out molasses; to feed *starch* a farmer shovels out grain; to feed *cellulose* he forks out hay or throws in cob, straw or stover.

The sugar in molasses digests fast; the starch in grain digests medium fast, and cellulose digests slowly. To make your

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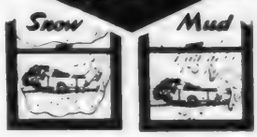

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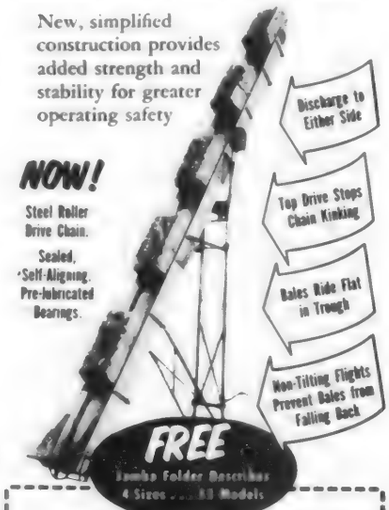
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cattle hungry so they will want to eat more, you add sugar or starch to your hay, straw or stover to help digest the food more quickly. Like opening the draft on a furnace, this consumes food faster.

For protein, which is around 10% of an animal's feed, bean or cotton seed meal offers a fat supply; so does good legume hay and yellow corn although each offers less protein than meal. Urea or ammoniated molasses are substitutes for protein. They help ruminants make protein from cellulose through bacterial action in the rumen of the animal.

To balance your livestock budget, keep in mind that you need sugar for fast digestion, grain for energy, cellulose for economy and protein because it is the basis of life's force.

POOR CORN can be fed if it is balanced by more nutritious feeds.

Here's an example of how a going farmer used a cheap cellulose to build a profitable feed.

Ben Levinson, whose farm is near Newport News, Virginia, where peanuts are a big crop, noticed that there were peanut hulls and skins going to waste all around him. Several years ago he felt that he could mix a ration using the hulls and skins for his herd of dairy cattle, so he contracted to take all the refuse from one peanut mill. This amounts to 3½ tons a month. "I wish that I had more," says Levinson.

The formula he uses for his feed is:

300 pounds of hulls, skins and molasses. This mixture is made by spraying 100 pounds of molasses over 200 pounds of hulls and skins. (The hulls and skins are in a 50-50 weight mixture in the factory refuse. The molasses is sprayed over the peanut hulls-skin mixture with a "Multi-Mist" molasses machine which is made by Mills Service Supply Co. at Ft. Worth, Texas.)

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Then a dry mixture of the following is made and mixed with the above:

45 pounds of urea.
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These ingredients are mixed thoroughly before going into a mix of:

900 pounds of corn and cob meal.
200 pounds of oats.
200 pounds of peanut meal.
100 pounds of linseed meal.

1,832 pounds — total mixture.

The Glauber salt (sodium sulphate) is added to supply some sulphur to the mixture, which helps the rumen bacteria of a cow turn urea into protein.

The dry mixture mentioned above is fed into the mixer a shovelful at a time so that it is well mixed with the rest.

The grain-peanut hull mixture was fed on the basis of one pound to every 3 pounds of milk the cow produced by Levinson's herd of 125 Holsteins.

Says Levinson: "A few years back we were using peanut hulls for bedding. Now not many of them are going to waste around these parts any more."

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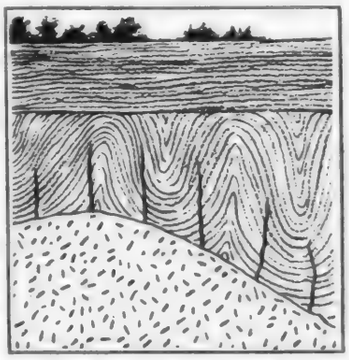

MILLIONS OF YEARS AGO, while the earth was cooling, a "pocket" of rare minerals was formed at Lithonia, Georgia. Geologists say this is the only deposit of its kind in North America. Soil scientists say that the lack of some of these rare minerals in soils may inhibit the action of major plant food elements, reducing yields, cutting crop quality. Your land may need these minerals.

$4.26 an acre a year for fertilizer and HYBRO-TITE helps B & O Ranch get up to 15 tons of $45 hay an acre

Dave Oliver, Jr., of the famous B & O Ranch, Boca Raton, Fla. (photo at left), writes that $4.26 an acre a year spent for Hybro-Tite and fertilizer helps them get 9 to 15 tons of Pangola hay an acre (worth $40 to $45 a ton f.o.b. the ranch) on what was raw, sandy Palmetto land two years ago—"in addition to running a cow an acre a year on a year-round basis." Mr. Oliver also reports exceptional results with Hybro-Tite for citrus—says "The fact that we've applied more than 1,000 tons of Hybro-Tite is ample evidence we find Hybro-Tite useful."

O. A. Bailey, Bailey Dairy, Pensacola, Fla., writes that cows prefer grass grown with Hybro-Tite and "on land where Hybro-Tite was applied we had excellent growth, increase in nitrogen efficiency, 10% more milk production."

W. A. Thornton, Decatur, Ga. (photo at right), reports bumper crops of melons, beans, sweet corn, peppers, other vegetables, with Hybro-Tite in spite of the drought. Others report exceptional results with Hybro-Tite on pecans, citrus, watermelons, permanent pastures, corn, legumes. Send for booklet TODAY.

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We have invited 250 of America's leading farmers to test Hybro-Tite on selected crops in 1953. Direct carload shipments (40-ton cars) are being made at nominal cost. Suggested rate of application of Hybro-Tite is a ton per acre with a thousand pounds per acre of raw rock phosphate, basic slag, or equivalent, applied at the same time, if needed. You may be able to use one or more cars yourself, or arrange with neighbors to share a car.

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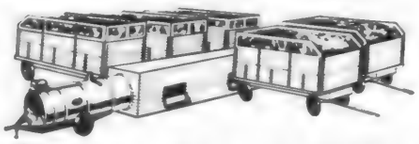

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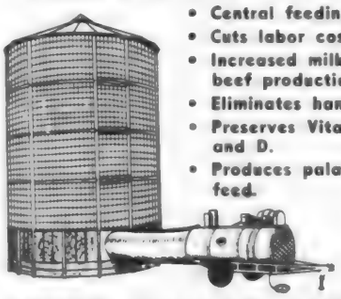

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As we do so, the top level of the soil becomes each year more and more porous, the excess water draining down the harder surface of the subsoil nine to ten inches below. As most of these seepage spots occur on our hill land which is kept largely in heavy pasture, they have never been a very great inconvenience, but by process of continually augmenting the organic material we have corrected the drainage in most of these spots, and in the hot dry weather they provide us with our best pasture.

Below the largest piece of woodland lies a swampy 30 acres known at Malabar as "The Jungle", overgrown with underbrush and some valuable timber. It is ideal game cover and filled with springs and in May the earth is carpeted with trillium, violets, anemones, hepaticas, Dutchman's breeches and other wild flowers. Here the springs flow more and more each year to join the flow of a creek which no longer floods and changes its course each year tearing out the old deep fishing holes. Very happily and very rapidly we are getting back to the Indians.

DAIRY BARN

(*Continued from page* 16)

than shipping fever, but Dr. Bernard, the veterinarian, believed that the outbreak had caused at least one abortion. He recommended electronic warfare against the germs.

Within a week Groesbeck had installed six General Electric germicidal lamps to cover his 40 by 40 foot barn. Each lamp is a 36 inch tube mounted in a bracket like those used for fluorescent lights. Each with its bracket cost around $20 and uses less electricity than a light bulb—about the same as a tube light. In short order, the cows stopped their sniffling and, what is more, Groesbeck found that the lights killed the lice knits and the cows were being deloused. Now he is planning to install the lights in the calf pens.

Certain precautions should be observed in using the lights. They should be placed at least eight feet over the cows or else used with baffles which make it safe to have them closer. The switch for the lights should be near the door so that a man entering the barn can turn off the lights since they are hard on the human eye, giving it the gravelly feeling you get from looking at a welder's flame without glasses. (The light doesn't seem to have a bad effect on the cows' eyes.) Groesbeck found that the best solution was to turn on the lights at night after milking and turn them off in the morning when he came out to milk—in this way he treated the cows when they were in the barn and didn't run much danger of his kids coming into the barn without realizing that the lights were on.

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LETTERS

(*Continued from page* 12)

ing. So, I bolted a discarded truck mirror to a stake, which, if placed against the sun or even on a cloudy day, can easily be seen.

Also, last spring I needed a grass seeder so I cut the bottom out of a ten-gallon cream can, turning it upside down and bolting it to the top side of an old hand seeder—after removing the bag, crank, and gears. I had the welder weld the blade from the old seeder to the shaft of a 6-volt motor from a discarded car heater and made a frame to attach the whole thing to the back of a pick-up truck. It operates very satisfactorily from the battery of the truck.

Ray J. Delap

Kansas, Illinois

Can you match this?

Prospecting For A Donkey

Sirs:

Could you help us locate a breeder who sells burro donkeys. We would like to secure a jack and a jenny and understand that in the East a number have been imported from Sardinia and they are being bred and sold throughout the East. There are not very many of them here in the West and we cannot locate any.

Ralph C. James, Jr.

Redmond, Washington

Tree Tomatoes In Paradise

Sirs:

My first copy of Farm Quarterly arrived recently and I find it different and interesting since conditions in our two countries are very dissimilar. For instance, here we do not house dairy cows since our winters are mild, so labor is reduced and we can carry up to a cow to the acre in some areas.

Here, in the Bay of Plenty, the climate is subtropical with about 80 inches of rain each year, no snow, two months of winter (in *your* summer) and about 20 frosts of up to 4 or 5 degrees. Because of this, grass grows all the year round, the only winter feed needed is hay or silage and the carrying capacity of some farms, my brother's for example, is one cow and three sheep to the acre. The average dairy herd is around 60 cows and the labour employed is one hand besides the owner.

Timber grows well in the district, *Pinus radiata* being ready for milling in 20 years from planting. In fact, a pulp mill is being built here to cope with the timber from the Kaiangaroe forest, the largest man planted woodlot in the world. Planted 30 to 40 years ago the trees are over-matured and some are starting to decay.

My place is an orchard of 8 acres and is mostly lemons, from which I am able to harvest up to 10 bushels a tree—the average here is around seven bushels. Besides this I have tree tomatoes and chinese gooseberries which I believe are almost unknown in the States. Both have a ready sale and were much sought after by the G. I.'s here during the war.

The soil is a pumice loam and can be worked right after a rain, even a rain that exceeds six inches as at times it does, yet the soil does not dry out in summer. However, it must be heavily manured.

This is not a tourist brochure soliciting immigrants, but just a contrast of our two ways of farming.

Colin Spratt

No. 3 Road, Carruth's R. D.
Te Puke, New Zealand

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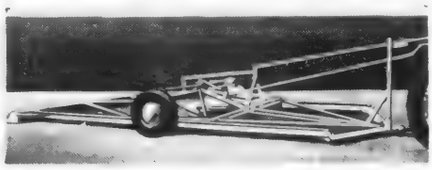

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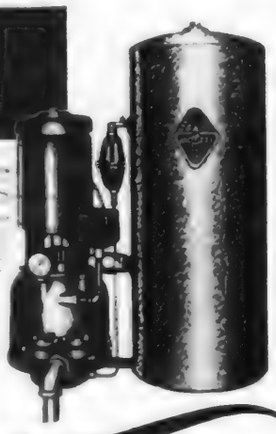

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POULTRY YARD

(*Continued from page* 20)

sires, we turned the important job of breeding over to specialists. Though we can't control the breeding that goes into our flock, we can pick and choose among the hatcheries who are after our business. Some of the inherited characteristics we should know about are the mortality rate of young and mature birds, the body weight at various ages, the number of eggs laid per year, the average egg weight, shell color and texture, the feed consumption to reach a given weight or produce a given number of eggs, freedom of eggs from blood or meat spots, thickness of the albumen. The economy of raising the birds and the value of their eggs depend on just these factors. Reliable breeders keep records of the performance of their flocks. A comparison of these records will give the farmer an idea as to his best buy—the best buy isn't always the cheapest, either.

Clipped Wings Tame Leghorns The 3,000 white leghorn hens on Bill Klingshirn's poultry farm at Ft. Recovery, Ohio, no longer fly over fences or roost in trees and poultry house windows. "They're a lot quieter all the time than they used to be," says Klingshirn.

Klingshirn was searching for a way to get tamer leghorns when he decided to try the turkey growers technique. For three years now he has been clipping one wing of every female chick he broods. The result is that his birds can't fly higher than 36 inches. He no longer has trouble keeping them fenced on range and he finds that they're easier to handle from the beginning.

Klingshirn uses a sharp pair of shears to cut off one wing of each chick at the first joint. The operation is performed on day-old chicks only, because at that age they loose very little blood and, according to Klingshrin's records, "suffer no mortality from the clipping." He can handle 500 chicks an hour.

His one warning is not to cut the wings of cockrels that are to go into breeding flocks. With one short wing they have trouble balancing themselves at mating time.

CORN BUILDS FERTILITY

(*Continued from page* 35)

and (3) Manure.

Let's work out the nitrogen balance for a typical farm situation. Smith is a grain farmer and wants to grow 125 bushels of corn per acre. He has his soil tested and finds that his organic matter runs 3.0 per cent. On his silt loam soil this means that he has 60,000 pounds of organic matter per acre in the plow layer. (Most of the organic matter is in this layer.) Since organic matter runs about 5 per cent nitrogen, his soil contains 3,000 pounds of nitrogen per acre. Since the soil is a silt loam about 2.5 per cent of the nitrogen,

or 70 pounds, will be available for this corn crop. This is enough nitrogen to produce 28 bushels of corn (it takes 2.5 pounds of nitrogen to produce a bushel).

Most sods are turned for corn after they have lost so much of the alfalfa stand that they are considered unsuitable for hay. Let's say Smith plows under a fair sod for his corn. Sixty pounds of nitrogen are added if the 2,000 pounds of organic matter runs 3.0 per cent nitrogen. Half, or 30 pounds, of the nitrogen will become available for this crop. This will give us an additional 12 bushels of corn. Smith is a grain farmer and has no manure to add so there is no nitrogen to be added from this source.

Totaling up the available nitrogen we get (1) 70 pounds from the soil plus (2) 30 pounds from sod turned under plus (3) none from manure, or a total of 100 pounds of nitrogen from all sources. Dividing 100 by 2.5 gives us an expected yield of 40 bushels per acre.

Smith's goal is 125 bushels per acre. Subtracting 40 from 125 leaves him 85 bushels short of his goal. Multiplying 85 by 2.5 we find that Smith will have to add 212.5 pounds of additional nitrogen to produce his goal of 125 bushels of corn. For starter fertilizer Smith intends to use 200 pounds of 10-10-10. This will supply 20 pounds of the nitrogen leaving 192.5 pounds of additional nitrogen which must be plowed down prior to planting or applied later as a sidedressing. His best bet would be to plow down most of this needed nitrogen. Plowing down before planting has several advantages over sidedressing. Plowing down nitrogen: (1) is not hampered by bad weather: (2) takes less time than sidedressing: (3) does not prune corn feeder roots when the cultivator points go through the rows: (4) gets nitrogen down where soil will be moist even in dry weather. If it is plowed down, it can be applied in a high nitrogen mixed fertilizer like 10-10-10 or it can be applied as a nitrogen material. Some farmers prefer to apply the nitrogen in furrow bottoms as they plow the land, while others prefer to spread on the land and then plow it down. When we disk nitrogen into the surface of the soil, we are encouraging the weeds which compete with the corn for moisture and plant food.

Phosphorus and Potash Necessary

The nitrogen need of corn has been stressed while very little has been said about phosphorus and potash. Applying large quantities of nitrogen to corn without assuring enough phosphorus and potash, doesn't help much. Nitrogen alone would probably boost corn yields about a bushel for each 2.5 pounds of available nitrogen for one or possibly two years. Then when the soil is unable to meet the phosphorus and potash needs of the nitrogen-boosted corn crop the production would nose-dive.

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somewhat like an appetizer before a banquet. It peps up the corn and keeps it going until the main plant food supply is reached by feeder roots. It works well because it contains all three basic plant foods.

Where phosphorus and potash are extremely low in the soil, nitrogen may give no yield increase at all. In a university field test in Western Iowa on a high potash soil which was very deficient in both phosphorus and nitrogen, 80 pounds of nitrogen per acre alone gave a 3-bushel increase in corn; phosphate alone (80 pounds of available P_2O_5) gave a 14-bushel corn increase. The combination of nitrogen and phosphate gave a 45-bushel increase. In this extreme case, nitrogen had little value unless used with a heavy application of phosphate.

Lots of Stalks

To get the greatest return from increased fertility, the plant population must be stepped up. More plants are required to make use of the increased supply of plant food. Average yields throughout the corn belt indicate that there are less than 8,000 corn plants per acre. Fields in the South average less than 6,000 plants per acre. It is impossible to get efficient yields with low plant populations. Populations of 16,000 to 20,000 stalks per acre are advisable where large yields are the goal. Hundred bushel yields are possible with 12,000 plants per acre but best efficiency is obtained with more plants. You should shoot for at least 14,000 plants. This means planting at least 16,000 kernels of corn per acre. Producing 125 bushels calls for a stand of at least 16,000 plants. This means that we must plant 19,000 kernels or more per acre. This allows 15 per cent loss for kernels which won't come up and plants which will be lost during the growing season.

Does It Pay?

Plenty of tests show that increases in corn yields can be made with the use of nitrogen balanced with phosphorus and potash. The important question is: Will it pay the farmer to use fertilizer nitrogen? At present corn and fertilizer prices, the answer is a great big "yes!" It is likely that the answer will remain "yes" for quite a while. With nitrogen selling for about 15 cents per pound and corn worth about $1.50, a bushel of corn will pay for 10 pounds of nitrogen. Where 2.5 pounds of nitrogen costing 38 cents produce a bushel of corn, farmers are losing out on a good thing if they don't step up production with plant food.

An example of costs and returns from two 20-acre corn fields which were fertilized differently emphasizes the profit angle even stronger. The well fertilized field averaged 106 bushels per acre for a total of 2,120 bushels. Total cost was $1,895.40. The total profit from this 20-

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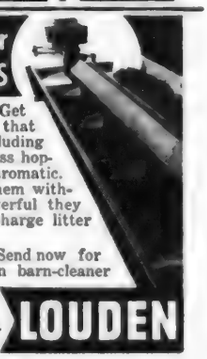

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acre field with corn selling at $1.50 per bushel was $3,180 (value of corn) minus $1,895.40 (production cost)=$1,284.60, or $64.23 per acre.

Another 20-acre field yielded 48 bushels per acre—a total harvest of 960 bushels. Total costs were $1,404.30. Total income from this 20-acre field was $1,440 (value of corn) minus $1,404.30 (production cost)=$35.70, or $1.79 per acre profit.

The main difference in cost was that the first field received more plant food, $810 worth, as compared with $412.40 worth on the low-yielding field. This additional money spent for plant food more than doubled yields and produced a good profit where there was almost none on the low-yielding field. Farmers always stand more chance of making a profit where the volume of production per acre per farm is great. This makes it possible to divide up cost per acre among more units of production. There are some costs such as plowing, disking, harrowing, planting, seeding, cultivating and harvesting that are pretty well fixed, whether a large yield or a small one is produced.

The use of plant food to increase the return from corn is profitable. However, there is much that can be done to make corn growing at high fertility levels more profitable. The hybrids now grown are good. But they aren't good enough. We need hybrids bred specifically for use in high-fertility situations. There are experimental results which indicate that under the same soil and climate conditions, some hybrids will respond to more fertility than other hybrids. In field experiments conducted by Dr. L. L. Huber of Pennsylvania State College, where 0, 800, and 1600 pound amounts of 10-10-10 were applied to a group of hybrids, most of them responded satisfactorily to the 800-pound rate. Where 1600 pounds of 10-10-10 were applied, only a few hybrids responded to the additional fertility. This point is to be tested further, but it emphasizes the fact that not all hybrids are equally responsive to high fertility levels.

Hybrids are needed that will resist insects, diseases and stalk breakage. All of these have important ramifications. An insect-chewed, diseased or broken plant can't produce a good ear of corn. We need strong, healthy stalks with well-developed ears that mature on time and stand well until picked. Then we can pour on the plant pood to put on the ears and to fill them with golden grain.

Farmers with Ideas

Corn, being the big crop on most Midwest farms, seems to bring out all kinds of farm inventions, and a willingness to try something new. Roy Holding, the Farm Editor of the *Kalamazoo Gazette,* tells a story of a new way of planting corn that has caught on in Southern Michigan.

"It was a sad day for Andrew Shugars and Jim Howe six years ago when they stood by helplessly while their pop corn fields dried out 'so hard the cultivator teeth wouldn't even put a scratch on the surface.'

The next year Shugars set up a 12-acre test plot, threw out the conventional method of seedbed preparation, and tried planting his corn in a revolutionary manner. He called it planting on the furrow.

Today, Michigan farmers come from miles around to see the corn fields planted by Shugars and Howe. A fieldman of a large tractor producer came to see if his company would have to make any changes in the design of its product so that it could be used in the planting method of the two men and went away astonished at the simplicity of the operation. Over 1,000 acres of field corn were put in on the furrow by farmers in the Southwestern Michigan counties of Allegen, Van Buren, and Kalamazoo this year. Planting on the furrow has created such interest that it may spread to other states by next planting season.

"Its value is proven as far as we're concerned," says Shugars. "We put 372 acres of popcorn on the furrow this year and just wouldn't think of planting in the conventional manner any more."

Shugars and Howe only plow their fields. The three or four trips across the field with a disc and drag in the conventional seedbed preparation are forgotten. A corn planter pulled by a small tractor with its rear wheels set on the inside of the wheel

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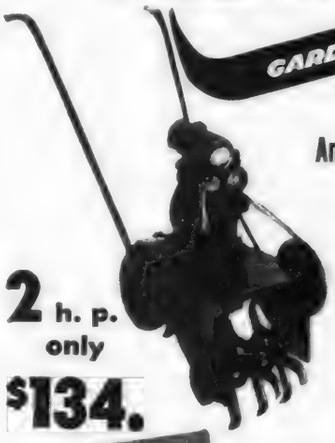

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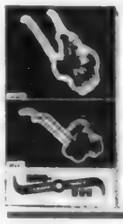

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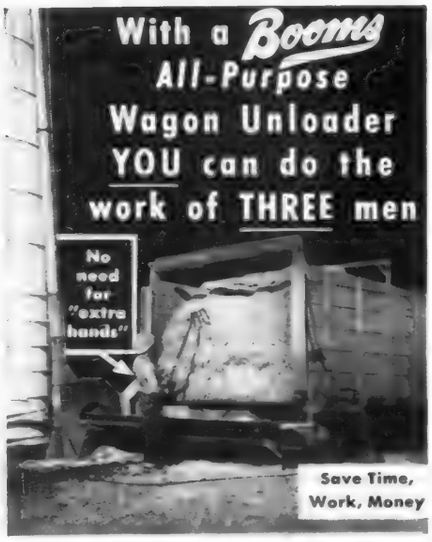

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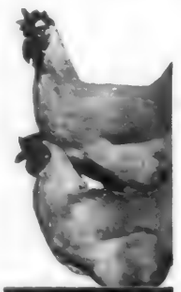

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disc so that it can run in the same track as the planter follows up the plow. While Howe plows, Shugars follows behind him with the planter.

The 40 inches of soil in between the rows, much of it turned up by the plow, is left unpacked and serves as a mulch. The tractor wheels provide all the seedbed necessary for corn by packing down the furrow.

Here's what Shugars and Howe say planting on the furrow does:

1. Saves labor, time and money.
2. Improves the structure of the soil over a period of years.
3. Makes more moisture available to the crop during the important earing and tasseling periods.
4. Reduces and eases the number of cultivations required.
5. Cuts the amount of run-off and washing in a field.
6. Eliminates the need for some conservation practices such as strip cropping and waterways.

Howe and Shugars disagree on the amount of money saved in seedbed preparation. Shugars thinks its about $8 an acre.

Howe claims its more like $15. The method eliminates the fuel, labor, and wear and tear on the tractor usually required in the discing, dragging, and two or three cultivations the operation saves.

"We get more value from the humus in the soil. All our corn is so green and high that in most years we don't need a side dressing of plant food," Howe points out. "If a field was in heavy sod, it's surprising how soon the sod rots. In five weeks after plowing it will have rotted. I've plowed up fields where the soil was packed down with conventional seedbed preparations and found the sod that was turned over two years before.

"Moisture is more evenly distributed," Howe goes on. "A neighbor, Joe Oehlhaffen, planted his field corn on the furrow last year on land that was all knolls and hills. There wasn't a bit of difference in the size of the corn anywhere in the field. You don't get wet spots and you have eight inches of mulch, forty inches wide between the rows to soak up all moisture."

"The corn gets a start on the weeds, too," Andy Shugars puts in. "It's 12 to 18 inches high most years before the weeds ever get started in the row. Then you can bury them easily with one cultivation. In the loose soil between the rows, weed seeds sometimes don't germinate until fall. Herb Ford over here cultivated his field corn only once last year. A man can get away with two and at the most three cultivations. One of our neighbors who planted in the conventional manner this year had to cultivate five times."

Some of their popcorn fields will go better than two tons to the acre this year —a rarity in Michigan pop corn growing. George Fritz who also lives in Van Buren

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County, got one of the best yields of silage corn he has ever had last year by planting on the furrow, even though the field was not sown until late in June.

The method also has its conservation value according to Shugars.

"One of our fields had a washout. We plowed and planted it in this manner and now there isn't a sign of a washout. When your soil is loose and can absorb the water you can't have runoff. In August during a dry year when fields are baked hard even our clay soils are loose and friable. We've had other farmers, who couldn't even dent their fields with a cultivator, come over and examine our tools to see what we were using to cultivate.

"You see," explains Shugars, "in changing over from horses to tractors, we have packed down our soil too much and broken down its structure. By planting on the furrow, we eliminate a lot of those trips across the field and save the structure."

The method has also allowed the two men to plant corn on some of their fields for the last five years running with constant and evident build-up in the fertility of the soil, according to Howe.

"By speeding up germination of the seed, planting on the furrow has hastened the maturity date of some corn fields by eight to ten days."

Both men are quick to point out that a small tractor with a wheel base that can be adjusted to fit that of the planter must be used.

"We just take the rear wheels off and put them on again on the side of the wheel disc," explains Howe.

"The whole secret of the operation is a good job of plowing," says Shugars. "The furrows must lay over nicely. If they don't and you have chunks here and chunks there, you will have a lot of difficulty planting the field."

Farming on Stilts

Irving Borchers of Monmouth, Illinois, does custom farming in the center of unending fields of corn that grow along the Mississippppi River. Early in the game he made a detasselling machine—a tractor on stilts. Then, about five years ago, he began to think about using this expensive outfit for more than just a few weeks a year. In his new Warren Hi-Clearance machine he has a versatile machine that can be used all through the corn season. It is powered by an International tractor and carries a 275 gallon tank between the rear wheels. As a sprayer, its pump throws out a high-pressure mist over a 40-foot width so that it can be used for weed control or spraying the corn for ear worms. The spray boom is hydraulically controlled from a distance of 1½ feet from the ground up to 8½ feet. Using a lower pressure, the tank can be connected to cultivator tines and put to work side dressing corn (see photograph on page 32) with liquid fertilizer. Having high clearance, the machine can be run through the corn no matter how high it grows. In the fall, a set of revolving knives are attached to the front of the machine and it is run through the rows just as the corn is ready to ripen, when the moisture range is 38% to 42%. By chopping off tassels, the corn has been made to ripen as much as two weeks earlier.

Before the corn is picked, the machine has been used to plant wheat between the rows using Planet planters pulled behind the tractor and hydraulically controlled. A final spray operation of the year is given the corn stalks after picking, using a high nitrogen liquid fertilizer.

By spring, the decomposition caused by this spray makes the stalks crumble onto the ground and they are ready to add

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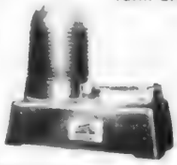

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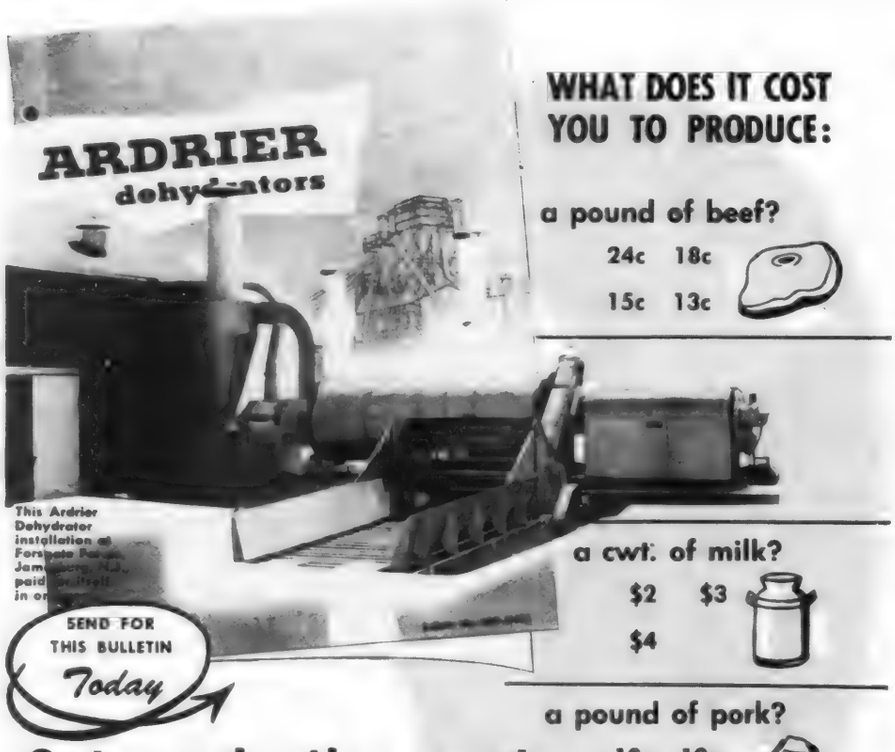

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TODAY, more than ever, you must use the least expensive feed you can get in order to produce meat, milk, eggs, butter and poultry at a profit. Quick "flash" dehydration of forage crops at the peak of their nutritional value, is the answer to low-cost feeding.

"Flash dried" forage retains the highest possible percent of nature's proteins, carotene and minerals to provide green-pasture nutrition in winter rations. You save on grain feeding and there's no need to buy expensive supplements and concentrates. Compare the relative food values shown in the chart below and you'll see why dehydrated forage crops are your best bet for lowest cost feeding. And on-the-spot processing of your own crops eliminates transportation costs.

Farmers report that their Ardrier Dehydrators are paying for themselves in a short time. It will pay you to investigate all the advantages of "flash" drying your crops with Ardrier Dehydrators.

COMPARE THESE FEEDING VALUES

	DEHYDRATED ALFALFA	CORN	OATS	BARLEY
Protein	17%-24%	8.5%	12%	12.5%
Fat	2.2%	3.8%	4.6%	3.5%
Fibre	18.29%	2%	12%	8%
N. Free Extract	38.5%	68%	58%	60%

Find out how you can feed GREEN-PASTURE NUTRITION all year 'round . . . at low cost.

There's more to dehydrating forage crops than just simple drying. The "flash" drying principle of Ardrier Dehydrators provides almost instantaneous drying in intense heat, yet with the low product temperature that assures full preservation of protein and carotene values.

Mail the coupon today for literature describing all the economy features of Ardrier Dehydrators and find how to save on your feeding costs.

ARDRIER DEHYDRATORS are manufactured for ARNOLD DRYER COMPANY by THE HEIL CO.

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Gentlemen: Please send me Ardrier Dehydrator Bulletin No. ARD-51405

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nitrogen and organic matter when turned under.

One of the most interesting speed-ups in the corn-wheat-clover rotation is taking place in Indiana. John Carson and his son, Frank, are farming 471 acres near Liberty. As soon as they get past the wheat fly-free date in the fall, they hop on their "bugs"—as they call their small four-wheel Garden-All tractors—and start planting wheat. They use a five-tube McCormack, one-row wheat drill; one tractor can plant an acre an hour. Last fall they had 85 acres planted by the 10th of October and by the time they started to pick corn the wheat was three inches high.

PLANTING WHEAT between rows of corn.

Says John Carson, "Two years ago when we planted wheat after we picked corn, it got frozen out. That's when we decided to try between-the-row planting. Last year we got our wheat off to a good start by planting with little tractors before corn picking time, and we averaged 35 bushels to the acre on the wheat.

"We use 300 pounds of 3-12-12 to the acre in the wheat drill and it really pops out of the ground."

Farmers are learning that the way fertilizer has been used in the past is not always the right way. In the old days they would cut down on the use of fertilizer in corn-cropping when prices were declining. By doing this they would cut down on their yield and make the cost of producing a bushel of corn go higher. For there are fixed costs in raising corn, that stay the same whether you get 45 bushels or 65 bushels; plowing, planting, cultivating and even picking costs nearly the same.

It's a good bet to build your soil and build your corn yield with *enough* fertilizer.

THE AUTHOR: Dr. Aaron Baxter, a native of Alabama, has been an agronomist with Coke Oven Ammonia Research Bureau of Columbus, Ohio, since 1949. He got his B.S. degree in Agriculture from Alabama Polytechnic Institute in 1938. After graduation he served Alabama Polytechnic as assistant agronomist and soil surveyor until he entered the army in 1941. He received the Ph. D. degree from Ohio State University in 1950.

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These exclusive Papec features are the reasons why . . .
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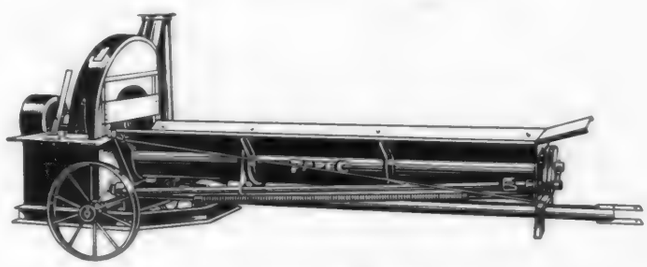
Two models, both available with engine or power take-off drive, and cutter bar attachment.



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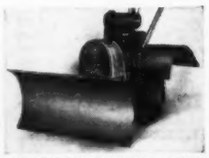
Say goodbye to plow, disc, and harrow. With **ROTOTILLER** you can prepare ideal seedbed in most soils—in **ONE PLEASANT OPERATON.**

ROTOTILLER'S Power Wheel Barrow is a year 'round joy. Has **THREE** times the capacity of ordinary hand wheel barrows —and practically no work!

ROTOTILLER, with its narrow width and special root-saving tines, is the handiest, easiest-to-use, most scientifically designed machine ever built for cultivating.



LIGHTNING-CHANGE SNOW PLOW Attachment makes it easy to move as much snow as 8 men with shovels. Can also be used as rugged light **BULLDOZER.**

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12 Wonderful Lawn AND Garden Machines...ALL-IN-ONE!

NEW 1953 GASOLINE-ELECTRIC, *Lightning Change*

ROTOTILLER

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HOW would you like a MECHANICAL HANDYMAN to take over all of your back-breaking lawn and garden jobs? ONE easy-to-use machine that can "breeze through" the work of *12 different skilled hired hands in one day—all at a cost of less than $1 a day!*

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MORE Lawn and Garden Beauty—with LESS Work!

With the new 1953 Gasoline-Electric ROTOTILLER you can prepare a seed bed in any kind of soil or sod—*without changing attachments.* Then in less than 60 seconds—with amazing *low-cost* Lightning-Change attachments—your ROTOTILLER becomes a power LAWN MOWER . . . a COMPOSTER that composts *right in the garden itself* . . . a CULTIVATOR that cultivates with minimum damage to plant roots . . . a powerful ROTARY MULCHER MOWER... a SPRAYER . . . an ELECTRIC CHAIN SAW... PORTABLE GENERATOR — *and that's only the beginning!*

Whether it's plowing snow or mowing lawns; hauling topsoil or pumping water, your ROTOTILLER does it more quickly, with less effort. Why not make your garden and lawn work a joy instead of a headache?

The Amazing Rototiller Does a Whole Day's Gardening Chores in an Hour!

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Please send me by return mail a copy of your FREE BOOK telling me all about the New 1953 Gasoline-Electric ROTOTILLER and its many Lightning-Change Attachments. Also send me FREE your Book and Planting Chart telling everything I'll ever need to know to increase soil fertility—at low cost—with Green Manure.

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ANNOUNCING

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MINNEAPOLIS-MOLINE MM MODERN MACHINERY

you asked for a tractor with MORE MUSCLE... a tractor that's EASIER TO OPERATE... SAFER and MORE COMFORTABLE! NOW...find everything you want in the NEW, 3-4 plow UB

Now, the new, advanced MM Model UB Tractor offers far more than ever before. MORE power! EASIER handling! NEW safety! GREATER economy! LONGER-LIFE features that mean even bigger value for your tractor dollar.

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1. **MORE POWER!** Higher compression cylinder heads, greater compression ratio give you *more power*, with *new fuel economy!*
2. **NEW HIGH PLATFORM!** This one big feature gives you greater visibility, puts you up away from dust and heat, provides ample standing room for a change of pace while driving the tractor. Platform gives a *safe, solid* foundation for new tractor seat.
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4. **NEW STARTER!** Your Model UB will start time and again where other tractors fail. Shorter cables cut down power loss.
5. **NEW CENTER LINE STEERING** and "needle bearing" universal joints give you the most responsive, easy to control tractor on the market . . . equal vision on both sides of tractor. Throttle is right under the steering wheel.
6. **NEW SAFETY FEATURES** include shield over hydraulic Uni-Matic jack, complete protection from working parts of Uni-Matic and PTO attachments.
7. **NEW PRESSURE COOLING!** Cooling system like most automobiles . . . sealed system cuts out anti-freeze losses.
8. **AUTOMATIC WEATHER CAP** keeps moisture out of your tractor, stays open automatically while tractor is operating. New extra-capacity fuel filter.
9. **NEW FLOTE-RIDE SEAT!** You've never felt such *comfort!* New seat pan, new springs to take the shock, new hydraulic cylinder to absorb rebound . . . weight, distance from steering column, and furrow leveling adjustments. Seat can be flipped back if operator wishes to stand.
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11. **NEW BRAKE SYSTEM!** You'll appreciate the longer brake pedals (both on the right side of the steering column) . . . disc type brakes that operate on the transmission countershaft . . . close spacing that eliminates locking pin . . . brakes that can be locked in "on" position by foot lever.
12. **NEW ROLLER DRAWBAR** that can be locked in place or allowed to roll free.
13. **LIVE POWER TAKE-OFF!** Live PTO lever is convenient to operator. Pulled back, lever disengages tractor wheels but allows PTO shaft to turn and clear clogged or jammed PTO implement. Live PTO is optional equipment on the new UB.
14. **STELLITE EXHAUST VALVE INSERTS** for best high compression performance, longer wear.
15. **NEW, STRONGER "BOSSES"** on side of transmission case provide far greater strength for front-mounted loaders or implements. Extra bolt holes fit a variety of attachments.
16. **LIKE DRIVING THE LATEST MODEL CAR!** MM has designed the new UB to place the steering wheel, throttle, clutch, and brake pedals right in front of the operator where they are naturally and easily reached . . . yet the UB keeps the exclusive MM Vision-lined design.

SEE YOUR MM DEALER NOW . . . COMPARE THESE BIG TRACTOR IMPROVEMENTS. DISCOVER HOW *MUCH* MORE YOU CAN GET FOR YOUR TRACTOR DOLLAR WHEN *YOU* BUY A NEW MM MODEL UB.

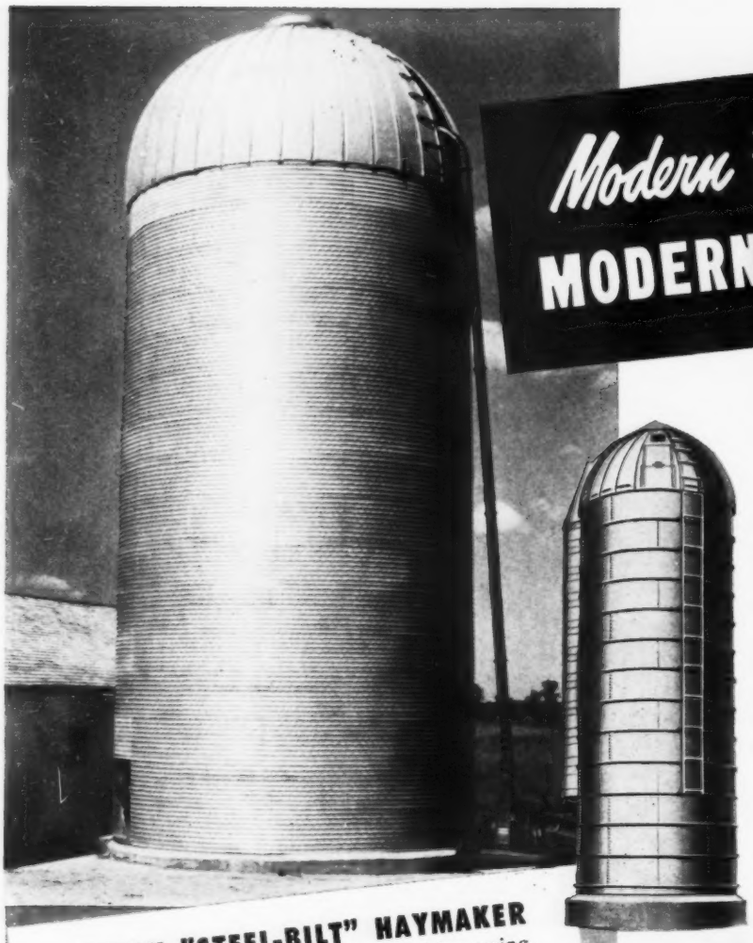
MINNEAPOLIS-MOLINE MINNEAPOLIS 1, MINNESOTA

Here's the Model UB factory-equipped to burn LP gas. Ask your MM dealer about big savings with MM's LP gas system.

That bonus of power you get with the new, advanced MM Model UB cuts plowing costs to the very rock bottom.

Stand if you want to. The big, safe platform on the new Model UB gives plenty of space for a change of pace.

Modern Farm Buildings for MODERN FARM OPERATIONS



As in any other production operation, efficiency on the farm is controlled by three principal factors—type of equipment, methods and practices, and plant facilities. Today's modern farmers are utilizing the most up-to-date equipment and are following the latest recommended practices in crop and stock production. For the most part, however, they are not obtaining maximum efficiency and results because they are operating in an obsolete plant—the farm buildings are outmoded and do not conform to the needs of modern equipment and methods. Martin Farm Buildings are designed to meet this need for a modern farm plant. They are designed to meet efficiently the purpose for which intended—to eliminate crop losses and waste of labor.

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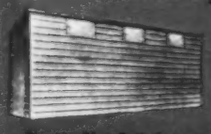
Assures the finest quality grass or corn silage without loss from spoilage or freezing. Withstands the high pressures of grass silage. Modern design, all steel construction for a lifetime of efficient use.

MARTIN "STEEL-BILT" HAYMAKER

The only structure exclusively designed for curing chopped hay. The full benefits of field chopping cannot be enjoyed unless the hay can be handled while of sufficiently high moisture that the leaves will not be lost in handling. Forced air curing of freshly cut, high moisture hay in the Martin Haymaker, assures pasture-fresh green hay for year around feeding. Eliminate weather worries in haymaking by the modern method which eliminates the need for field curing.

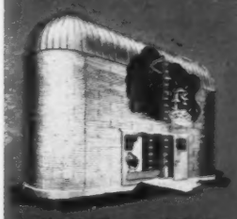
SAFE STORAGE PERMITS MODERN GRAIN HARVESTING METHODS

Good soil preparation and fertilization practices, high yielding seeds and mechanical harvesting equipment have caused a new storage problem for corn and small grains—that of high moisture at time of harvest. Martin grain storage buildings are designed to handle this moisture problem by incorporating scientific ventilating principles. Whether of low, medium or high moisture content, there is a Martin Building and Method to do the job.



Martin Slat Crib for ear corn and small grains.

Two Slat Cribs joined by driveway for equipment storage or feed room.



Martin Corn and Grain Elevator for ear corn and small grains.

Martin High Round Crib for storage of large volume, high moisture ear corn.

Martin Circular Bin for small grain and shelled corn.

PROTECT VALUABLE STOCK AND EQUIPMENT WITH LOW-COST, FIRE-PROOF, PERMANENT SHELTER

Farm tools, crops and stock are in constant jeopardy when stored in outmoded fire-traps. Martin offers three types of modern, all-steel, fire-proof buildings each of which is adaptable for cattle or stock housing, implement storage, work shop or other farm shelter and housing requirements.

STEEL MARTIN Farm Buildings -BILT

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